

**Registration form**

**Agricultural Applicator**  
**48 HOUR RUSH ORDER PROCESSING FEE ADDITIONAL \$50.00**  
*Rush service does not include overnight delivery or FedEx fees.*

**Start and finish dates:** \_\_\_\_\_

*You will have 90 days from this date in order to complete this course*

**Print Name** \_\_\_\_\_

**I have read and understood the disclaimer notice found on page 2 & 4. Signature is required. You can electronically sign with XXX**

**Signature** \_\_\_\_\_

**Address:** \_\_\_\_\_

**City** \_\_\_\_\_ **State** \_\_\_\_\_ **Zip** \_\_\_\_\_

**Phone:**  
**Home** (\_\_\_\_) \_\_\_\_\_ **Work** (\_\_\_\_) \_\_\_\_\_

**Fax** (\_\_\_\_) \_\_\_\_\_ **Email** \_\_\_\_\_

**License ID #** \_\_\_\_\_ **Exp. Date** \_\_\_\_\_

**Class/Grade** \_\_\_\_\_

**Please circle/check which certification you are applying the course CEU's.**

Commercial Applicator\_\_\_ Residential Applicator\_\_\_ Industrial Applicator\_\_\_

Pesticide Handler\_\_\_ Agricultural Applicator\_\_\_ Adviser\_\_\_ Other \_\_\_\_\_

**Technical Learning College**  
**P.O. Box 3060, Chino Valley, AZ 86323**  
**Toll Free (866) 557-1746 Fax (928) 272-0747 [info@tlch2o.com](mailto:info@tlch2o.com)**

**If you have paid on the Internet, please write your Customer #** \_\_\_\_\_

**5 digit number**

## Important Information about this Course (Disclaimer Notice)

This CEU course has been prepared to educate pesticide applicators and operators in general safety awareness of dealing with the often-complex and various pesticide treatment sprays, devices, methods, and applications. This course (manual) will cover general laws, regulations, required procedures and accepted policies relating to the use of pesticides and herbicides. It should be noted, however, that the regulation of pesticides and hazardous materials is an ongoing process and subject to change over time. For this reason, a list of resources is provided to assist in obtaining the most up-to-date information on various subjects. This manual is not a guidance document for applicators or operators who are involved with pesticides. It is not designed to meet the requirements of the United States Environmental Protection Agency or your local State environmental protection agency or health department. This course manual will provide general pesticide safety awareness and should not be used as a basis for pesticide treatment method/device guidance. This document is not a detailed pesticide informational manual or a source or remedy for poison control.

Technical Learning College or Technical Learning Consultants, Inc. makes no warranty, guarantee or representation as to the absolute correctness or appropriateness of the information in this manual and assumes no responsibility in connection with the implementation of this information. It cannot be assumed that this manual contains all measures and concepts required for specific conditions or circumstances. This document should be used for educational purposes only and is not considered a legal document. Pesticides are poisonous. Always read and carefully follow all precautions and safety recommendations given on the container label. Store all chemicals in the original labeled containers in a locked cabinet or shed, away from food or feeds, and out of the reach of children, unauthorized persons, pets, and livestock.

Confine chemicals to the property or plants being treated. Avoid drift onto neighboring properties, especially gardens containing fruits and/or vegetables ready to be picked. Dispose of empty containers carefully. Follow label instructions for disposal. Never reuse containers. Make sure empty containers are not accessible to children or animals. Never dispose of containers where they may contaminate water supplies or natural waterways. Do not pour down sink or toilet. Consult your county agricultural commissioner for correct ways of disposing of excess pesticides. You should never burn pesticide containers. Individuals who are responsible for pesticide storage, mixing and application should obtain and comply with the most recent federal, state, and local regulations relevant to these sites and are urged to consult with the EPA and other appropriate federal, state and local agencies.

**USE PESTICIDES WISELY: ALWAYS READ THE ENTIRE PESTICIDE LABEL CAREFULLY, FOLLOW ALL MIXING AND APPLICATION INSTRUCTIONS AND WEAR ALL RECOMMENDED PERSONAL PROTECTIVE GEAR AND CLOTHING. CONTACT YOUR STATE DEPARTMENT OF AGRICULTURE FOR ANY ADDITIONAL PESTICIDE USE REQUIREMENTS, RESTRICTIONS OR RECOMMENDATIONS. NOTICE: MENTION OF PESTICIDE PRODUCTS IN THIS COURSE DOES NOT CONSTITUTE ENDORSEMENT OF ANY MATERIAL. ALWAYS FOLLOW THE PRODUCT'S LABEL INSTRUCTIONS.**

I understand that it is my responsibility to ensure that this CEU course is either approved or accepted in my State for CEU credit. I understand State laws and rules change on a frequent basis and I believe this course is currently accepted in my State for CEU or contact hour credit, if it is not, I will not hold Technical Learning College responsible.

I fully understand that this type of study program deals with dangerous conditions and that I will not hold Technical Learning College, Technical Learning Consultants, Inc. (TLC) liable for any errors, omissions, advice, suggestions or neglect contained in this CEU education training course or for any violation or injury, death, neglect, damage or loss of your license or certification caused in any fashion by this CEU education training or course material suggestion or error. It is my responsibility to call or contact TLC if I need help or assistance and double-check to ensure my registration page and assignment has been received and graded. It is my responsibility to ensure all information is correct and to abide with all rules and regulations.

**CUSTOMER SERVICE RESPONSE CARD**

**Agricultural Applicator Training Course**

NAME: \_\_\_\_\_

E-MAIL \_\_\_\_\_ PHONE \_\_\_\_\_

**PLEASE COMPLETE THIS FORM BY CIRCLING THE NUMBER OF THE APPROPRIATE ANSWER IN THE AREA BELOW.**

1. Please rate the difficulty of your course.

Very Easy    0    1    2    3    4    5    Very Difficult

2. Please rate the difficulty of the testing process.

Very Easy    0    1    2    3    4    5    Very Difficult

3. Please rate the subject matter on the exam to your actual field or work.

Very Similar    0    1    2    3    4    5    Very Different

4. How did you hear about this Course? \_\_\_\_\_

5. What would you do to improve the Course?

\_\_\_\_\_  
\_\_\_\_\_

6. How about the price of the course?

Poor \_\_\_\_\_ Fair \_\_\_\_\_ Average \_\_\_\_\_ Good \_\_\_\_\_ Great \_\_\_\_\_

7. How was your customer service?

Poor \_\_\_\_\_ Fair \_\_\_\_\_ Average \_\_\_\_\_ Good \_\_\_\_\_ Great \_\_\_\_\_

8. Any other concerns or comments.

\_\_\_\_\_  
\_\_\_\_\_

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State Approval Listing Link, check to see if your State accepts or has pre-approved this course. Not all States are listed. Not all courses are listed. If the course is not accepted for CEU credit, we will give you the course free if you ask your State to accept it for credit.

## **State Approval Listing URL...**

<http://www.abctlc.com/downloads/PDF/CEU%20State%20Approvals.pdf>

*You can obtain a printed version of the course manual from TLC for an additional \$199.95 plus shipping charges.*

## **AFFIDAVIT OF EXAM COMPLETION**

I affirm that I personally completed the entire text of the course. I also affirm that I completed the exam without assistance from any outside source. I understand that it is my responsibility to file or maintain my certificate of completion as required by the state or by the designation organization.

## **Grading Information**

In order to maintain the integrity of our courses we do not distribute test scores, percentages or questions missed. Our exams are based upon pass/fail criteria with the benchmark for successful completion set at 70%. Once you pass the exam, your record will reflect a successful completion and a certificate will be issued to you.

For security purposes, please fax or e-mail a copy of your driver's license and always call us to confirm we have received your assignment and to confirm your identity.

Thank you...

# Agricultural Applicator Answer Key

Name \_\_\_\_\_

Phone# \_\_\_\_\_

**Multiple Choice. Pick only one answer per question. Circle or Mark off, Underline or Bold the answer.**

**Did you check with your State agency to ensure this course is accepted for credit? No refunds.**

***Method of Course acceptance confirmation. Please fill this section***

Website \_\_\_ Telephone Call \_\_\_ Email \_\_\_ Spoke to \_\_\_\_\_

**Did you receive the approval number, if applicable? \_\_\_\_\_**

***You are solely responsible to ensure that TLC receives the Assignment and Registration Key. Please call us to ensure that we received it.***

*I understand that I am 100 percent responsible to ensure that TLC receives the Assignment and Registration Key. I understand that TLC has a zero tolerance towards not following their rules, cheating or hostility towards staff or instructors. I need to complete the entire assignment for credit. There is no credit for partial assignment completion. My exam was proctored. I will contact TLC if I do not hear back from them within 2 days of assignment submission. I will forfeit my purchase costs and will not receive credit or a refund if I do not abide with TLC's rules. I will not hold TLC liable for any errors or damages or death. I will abide with pages 2 and 4.*

## **California DPR Requirement**

The Assignment must be submitted to TLC by December 27 in order to be submitted to DPR by the 30th. If it is late, you will be penalized \$50 per day.

**Please Sign that you understand and will abide with TLC's Rules.**

\_\_\_\_\_  
Signature

## CERTIFICATION OF COURSE PROCTOR

Technical Learning College requires that our students who takes a correspondence or home study program course must pass a proctored course reading, quiz and final examination. The proctor must complete and provide to the school a certification form approved by the commission for each examination administered by the proctor.

**Instructions.** When a student completes the course work, fill out the blanks in this section and provide the form to the proctor with the examination.

Name of Course: \_\_\_\_\_

Name of Licensee: \_\_\_\_\_

**Instructions to Proctor.** After an examination is administered, complete and return this certification and examination to the school in a sealed exam packet or in pdf format.

I certify that:

1. I am a disinterested third party in the administration of this examination. I am not related by blood, marriage or any other relationship to the licensee which would influence me from properly administering the examination.
2. The licensee showed me positive photo identification prior to completing the examination.
3. The enclosed examination was administered under my supervision on \_\_\_\_\_. The licensee received no assistance and had no access to books, notes or reference material.
4. I have not permitted the examination to be compromised, copied, or recorded in any way or by any method.
5. Provide an estimate of the amount of time the student took to complete the assignment.

Time to complete the entire course and final exam. \_\_\_\_\_

Notation of any problem or concerns:

Name and Telephone of Proctor (please print):

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_  
Signature of Proctor

**Agricultural Applicator - Exam Version – Circle or underline 1 2 3 4 5**

**Topic 1 – Crop Chewing Insects Section – Part 1**

1. A B C D	6. A B C D	11. A B C D	16. A B C D
2. A B C D	7. A B C D	12. A B C D	17. A B C D
3. A B C D	8. A B C D	13. A B C D	18. A B C D
4. A B C D	9. A B C D	14. A B C D	19. A B C D
5. A B C D	10. A B C D	15. A B C D	20. A B C D

**Topic 2 – Crop Chewing Insects Section – Part 2**

1. A B C D	6. A B C D	11. A B C D	16. A B C D
2. A B C D	7. A B C D	12. A B C D	17. A B C D
3. A B C D	8. A B C D	13. A B C D	18. A B C D
4. A B C D	9. A B C D	14. A B C D	19. A B C D
5. A B C D	10. A B C D	15. A B C D	20. A B C D

**Topic 3 – Crop Chewing Insects Section – Part 3**

1. A B C D	6. A B C D	11. A B C D	16. A B C D
2. A B C D	7. A B C D	12. A B C D	17. A B C D
3. A B C D	8. A B C D	13. A B C D	18. A B C D
4. A B C D	9. A B C D	14. A B C D	19. A B C D
5. A B C D	10. A B C D	15. A B C D	20. A B C D

**Topic 4 – Hopper Section**

1. A B C D	6. A B C D	11. A B C D	16. A B C D
2. A B C D	7. A B C D	12. A B C D	17. A B C D
3. A B C D	8. A B C D	13. A B C D	18. A B C D
4. A B C D	9. A B C D	14. A B C D	19. A B C D
5. A B C D	10. A B C D	15. A B C D	20. A B C D

**Topic 5 – Plant Sucking Insects Section – Part 1**

1. A B C D	6. A B C D	11. A B C D	16. A B C D
2. A B C D	7. A B C D	12. A B C D	17. A B C D
3. A B C D	8. A B C D	13. A B C D	18. A B C D
4. A B C D	9. A B C D	14. A B C D	19. A B C D
5. A B C D	10. A B C D	15. A B C D	20. A B C D

**Topic 6 – Plant Sucking Insects Section – Part 2**

1. A B C D	6. A B C D	11. A B C D	16. A B C D
2. A B C D	7. A B C D	12. A B C D	17. A B C D
3. A B C D	8. A B C D	13. A B C D	18. A B C D
4. A B C D	9. A B C D	14. A B C D	19. A B C D
5. A B C D	10. A B C D	15. A B C D	20. A B C D

**Topic 7– Stinging Insects Section**

1. A B C D	6. A B C D	11. A B C D	16. A B C D
2. A B C D	7. A B C D	12. A B C D	17. A B C D
3. A B C D	8. A B C D	13. A B C D	18. A B C D
4. A B C D	9. A B C D	14. A B C D	19. A B C D
5. A B C D	10. A B C D	15. A B C D	20. A B C D

**Topic 8 – Soil Dwelling Insect Section**

1. A B C D	6. A B C D	11. A B C D	16. A B C D
2. A B C D	7. A B C D	12. A B C D	17. A B C D
3. A B C D	8. A B C D	13. A B C D	18. A B C D
4. A B C D	9. A B C D	14. A B C D	19. A B C D
5. A B C D	10. A B C D	15. A B C D	20. A B C D

**Topic 9- Worker Protection Standard Introduction Section**

1. A B C D	4. A B C D	7. A B C D	10. A B C D
2. A B C D	5. A B C D	8. A B C D	
3. A B C D	6. A B C D	9. A B C D	

<b>Topic 10 - PPE Section</b>			
1. A B C D	4. A B C D	7. A B C D	10. A B C D
2. A B C D	5. A B C D	8. A B C D	
3. A B C D	6. A B C D	9. A B C D	
<b>Topic 11- WPS Required Training Section</b>			
1. A B C D	6. A B C D	11. A B C D	16. A B C D
2. A B C D	7. A B C D	12. A B C D	17. A B C D
3. A B C D	8. A B C D	13. A B C D	18. A B C D
4. A B C D	9. A B C D	14. A B C D	19. A B C D
5. A B C D	10. A B C D	15. A B C D	20. A B C D

Write down any problem questions.

**Rush Grading Service**

If you need this assignment graded and the results mailed to you within a 48-hour period, prepare to pay an additional rush service handling fee of \$50.00. This fee may not cover postage costs. If you need this service, simply write RUSH on the top of your Registration Form. We will place you in the front of the grading and processing line.

**When finished with your assignment.**

Please scan the Registration Page, Answer Key and Driver’s License and email it to [info@TLCH2O.com](mailto:info@TLCH2O.com).

If you are unable to scan, take a photo of these documents with your iPhone and send these to TLC, [info@TLCH2O.com](mailto:info@TLCH2O.com).

If you are unable to scan and email, please fax these to TLC,

**(928) 468-0675**

**If you fax, call to confirm that we received your paperwork.**

## **INSTRUCTIONS**

1. We will require all students to fax or e-mail a copy of their driver's license with the registration form.
2. You will need to pick one of the following five assignments to complete. This selection process is based upon your last name.

### **Assignment for Last Names**

***If your last name...***

**A-G** Assignment #1 – Pages 1, 3, 5, 7-9, 11-35

**H-M** Assignment #2 - Pages 1, 3, 5, 7-9, 37-61

**N-S** Assignment #3 - Pages 1, 3, 5, 7-9, 63-86

**T-Z** Assignment #4 - Pages 1, 3, 5, 7-9, 87-110

**Repeat students** - Alternative Assignment #5 - Pages 1, 3, 5-8, 111-134

**These exams are frequently rotated.**

**Complete all topics before submitting the answers key.**

### **California DPR Requirement**

The Assignment must be submitted to TLC by December 27 in order to be submitted to DPR by the 30th. If it is late, you will be penalized \$50 per day.

Due to constantly changing pesticide labels and pesticide chemical or product registration, some of the recommendations given in this writing may no longer be legal by the time you read them. If any information in these recommendations disagrees with the label, the recommendation must be disregarded. Always double check with the Pesticide Agency to ensure the pesticide product's registration is valid for these change frequently. No endorsement is intended for products mentioned, nor is criticism meant for products not mentioned. The author and Technical Learning College (TLC) assume no liability or damages resulting from the use of these recommendations.

## Agricultural Applicator Assignment #1 - A-G Last Names

You will have 90 days from the start of this course to have successfully passed this assignment with a score of 80%. You may e mail the answers to TLC, info@tlch2o.com or fax the answers to TLC, (928) 272-0747. This assignment is available to you in a Word Format on TLC's Website. You can find online assistance for this course on the in the Search function on Adobe Acrobat PDF to help find the answers. Once you have paid the course fee, you will be provided complete course support from Student Services (928) 468-0665.

**Write your answers on the Answer Key found in the front of this assignment.**

We will require all students to fax or e-mail a copy of their driver's license with the registration form.

Multiple Choice, Please select one answer and mark it on the answer key. The answer must come from the course text. (s) Means answer can be plural or singular.

Write down any problem questions.

### Topic 1 - Crop Chewing Insects Section – Part 1

#### Alfalfa Caterpillar (*Colias eurytheme*)

1. Control measures are justified when there are \_\_\_\_\_ worms per sweep of the net, and cutting will not take place during the next few days.

- A. 20                      C. 10
- B. 40                      D. None of the above

#### Description and Biology:

2. Larva / caterpillar: This larva is a grass-green color with a fine white stripe on each side of the body. The \_\_\_\_\_ has a very fine red line running through it.

- A. White stripe                      C. Yellow stripe
- B. Black stripe                      D. None of the above

3. Life cycle: The butterflies lay eggs singly on the undersides of leaves. A female can lay \_\_\_\_\_ eggs. The eggs hatch from 3 to 5 days.

- A. 1,000 – 2,000                      C. 75-100
- B. 200 to 500                      D. None of the above

#### Beet Armyworm (*Spodoptera exigua*)

4. The adult beet armyworm, *Spodoptera exigua*, is a grayish brown moth with a pale circular spot near the middle of the forewing.

- A. Red V                                      C. Orange circle
- B. Pale circular spot                      D. None of the above

5. Females begin laying \_\_\_\_\_ days after mating, and they prefer young rather than old plants. Flight activity is greatest in July and August.

- A. 2    C. 10
- B. 4    D. None of the above

### **Blister Beetles (Insecta: Coleoptera: Meloidae)**

#### **Description**

6. A few species have rounded “ball-like” abdomen or short wings and a larva-form abdomen. All blister beetles, however, have the distinctive narrow “\_\_\_\_\_” which contrasts with the broader head and abdomen.

- A. Head      C. Abdomen
- B. Neck      D. None of the above

7. Cantharidin is \_\_\_\_\_ when ingested by horses or other livestock and may cause illness and even death in these animals. It is a very stable compound that retains its toxicity to livestock even when dried remains of beetles, that have been killed in the harvesting process, are fed along with forage.

- A. Somewhat poisonous      C. Highly toxic
- B. Non-toxic      D. None of the above

8. Cantharidin may cause irritation to the lining of the stomach, small intestine, bladder and urethra in horses.

- A. True      B. False

### **Boil Weevil (Anthonomus grandis)**

#### **Introduction**

9. *A. grandis* spends the \_\_\_\_\_ in an adult reproductive dormancy where it subsists without food until it returns to cotton in the early \_\_\_\_\_.

- A. Spring – Winter      C. Summer - Fall
- B. Winter – Spring      D. None of the above

### **Cabbage Looper (Trichoplusia ni)**

10. Larvae: Young larvae initially are \_\_\_\_\_, but become \_\_\_\_\_ as they commence feeding on foliage. They are somewhat hairy initially, but the number of hairs decreases rapidly as larvae mature.

- A. Dusky white - pale green      C. Dusky white – light brown
- B. Pale green - dusky white      D. None of the above

### **Celery Leaf-tier (Udea rubigalis)**

11. The celery leaf-tier adult is a small \_\_\_\_\_ moth. In spring, this moth lays its eggs on the undersides of host plants. The tapered, \_\_\_\_\_ larvae feed for about a month before pupating.

- A. Brown - Yellow      C. Brown – Pale green
- B. Brown - White      D. None of the above

### **Clover Root Curculio (Sitona hispidulus F.)**

12. The clover root curculio life cycle is similar to alfalfa weevil in that the adults leave the alfalfa fields and spend the \_\_\_\_\_ in protected areas.

- A. Winter      C. Spring
- B. Summer      D. None of the above

13. Clover root curculio is most likely to be found in June and is apparently more common in \_\_\_\_\_ soils than in the \_\_\_\_\_ soils.

- A. Heavier, sandy      C. Sandy, lighter
- B. Sandy, heavier      D. None of the above

**Cotton Bollworm (*Helicoverpa armigera*)**

14. Young larvae are difficult to find until they are about \_\_\_\_\_ days old. At this stage, they are about ¼ inch long and brownish colored with some scattered hairs.

- A. 2 to 3      C. 3 to 4
- B. 3 to 6      D. None of the above

**Cucumber Beetle**

**How to identify cucumber beetles**

15. Adult striped cucumber beetle have \_\_\_\_\_ wings with three longitudinal black stripes.

- A. Red      C. Yellow
- B. Black     D. None of the above

**Cutworms**

16. Cutworms are similar in general appearance. They are smooth with very few hairs and are about \_\_\_\_\_ inches when fully grown.

- A. 3      C. 2
- B. 1      D. None of the above

**Earwig (*Forficula auricularia*)**

17. Adults overwinter in the soil. Females lay \_\_\_\_\_ cream-colored eggs in underground nests during January and February, and the newly hatched young (nymphs) first appear in April.

- A. 20-50      C. 500-1,000
- B. 100-500   D. None of the above

**Tomato & Tobacco Hornworm**

18. Larvae of both species have five pairs of prolegs (fleshy abdominal limbs of a caterpillar), are a cylindrical shape, and are \_\_\_\_\_ inches long at maturity.

- A. 3      C. 4
- B. 2      D. None of the above

**European Corn Borer (*Ostrinia nubilalis*)**

19. Eggs are deposited in irregular clusters of about \_\_\_\_\_. The eggs are oval, flattened, and creamy white in color, usually with an iridescent appearance. The eggs darken to a beige or orangish tan color with age.

- A. 15 to 20      C. 20-50
- B. 50 -100      D. None of the above

20. Male moths are pale yellow to light brown in color, with both the forewing and hind wing crossed by dark zigzag lines and bearing pale, often yellowish, patches.

- A. True      B. False

## Topic 2 - Crop Chewing Insects Section – Post Quiz Part 2

### Flea Beetles (Scientific Name: *Varies* Order: Coleoptera)

#### Life History

1. In the \_\_\_\_\_, the adults migrate out of their overwintering site as soon as adequate vegetation is available for feeding and egg deposition.
- A. Spring      C. Summer  
B. Winter      D. None of the above

### Flea Weevil

2. European elm flea weevils live through the \_\_\_\_\_ as adults and in the spring, move to the elm tree. Soon after, the adults lay eggs along the edges of the veins.
- A. Spring      C. Summer  
B. Winter      D. None of the above

### Four-lined Plant Bug (*Poecalocapsus linectus*)

3. The adult four-lined plant bug (*Poecalocapsus linectus*) is a 1/4 inch long, yellowish to yellowish-green True bug with four longitudinal black lines down the wing covers and black antennae. This plant bug looks somewhat like a spotted cucumber beetle.
- A. True      B. False

### Fruit fly / *Drosophila* Flies

#### Description of the Pest

4. Various species of *Drosophila* are known as vinegar or pomace flies. In vineyards more than \_\_\_\_\_% are *D. melanogaster* and *D. simulans*.
- A. 50      C. 25  
B. 95      D. None of the above
5. The life cycle in summer is only \_\_\_\_\_ days, with the adult laying \_\_\_\_\_ eggs in a 20- to 30-day life span.
- A. 7 -8, 700 – 800      C. 5-6, 300-400  
B. 7-8, 70 – 80      D. None of the above

### Fungus gnats (*Orfelia* and *Bradysia* species)

6. The adults are tiny, flying insects about 1/16 to 1/8 inch long. They look a little like small mosquitoes with gray bodies and long, slender legs. The wings are usually clear. The insects have \_\_\_\_\_ that are larger than their \_\_\_\_\_.
- A. Head - segmented antennae      C. Segmented antennae - Body  
B. Segmented antennae – Head      D. None of the above

### Ground Mealybug (*Rhizoecus kondonis*)

7. The ground mealybug feeds on alfalfa roots and can cause severe yield losses.
- A. True      B. False

### Hessian Fly (*Mayetiola destructor*)

8. Wheat (spring and winter) is the preferred host of the Hessian fly. Barley, oats, triticale and rye are generally considered resistant. Wild grasses such as quackgrass, western wheatgrass, rye grasses are also known hosts.
- A. True      B. False

**Japanese beetles (*Popillia japonica*)**

9. Adults are about 1/3 to 1/2 inch long with a metallic red head and green wing covers. There are two white patches along the side of the abdomen.  
A. True      B. False

**How to identify Japanese beetles**

**Larva (white grubs)**

10. \_\_\_\_\_-shaped, white to cream-colored grubs with a distinct tan-colored head.  
A. V            C. Y  
B. C            D. None of the above

**Leaf miners**

11. Leafminers overwinter as pupae either in the soil or in infested plant debris. In the \_\_\_\_\_, adult flies emerge and lay eggs on or near susceptible hosts.  
A. Summer    C. Fall  
B. Spring      D. None of the above

**Mexican bean beetle (*Epilachna Varivestis*)**

12. Eggs are approximately 1.3 mm in length and 0.6 mm in width, and are pale yellow to orange-yellow in color. They are typically found in clusters of \_\_\_\_\_ on the undersides of bean leaves.  
A. 300 -400    C. 40 to 75  
B. 50 -100     D. None of the above

**Pale-Striped Flea Beetle (*Systema blanda*)**

13. Adults have red and green longitudinal stripes and jump when disturbed.  
A. True      B. False
14. Adults feed on cotyledons early and lower leaves later in the season. Chewing mouthparts score the upper (most often) and lower surfaces of leaves without causing holes. Wounds bleed sap. Scarred tissues turn brown.  
A. True      B. False
15. The pale-striped flea beetle, *Systema blanda*, is a small, 3/16-inch beetle that invades peppers early in the season.  
A. True      B. False
16. Adults bear brown and white longitudinal stripes and jump when disturbed. Adults feed on cotyledons early and lower leaves later in the season.  
A. True      B. False

**Pea Aphid (*Acyrtosiphon pisum*)**

17. Prolonged periods of cool temperatures [\_\_\_\_\_] and dry conditions are conducive to the development of pea aphid populations.  
A. 50°F to 60°F      C. 60°F to 70°F  
B. 40°F to 50°F      D. None of the above

18. Up to \_\_\_\_\_ generations develop during the season. The entire life cycle takes about \_\_\_\_\_ days.
- A. 3, 12      C. 20, 12  
B. 12, 3      D. None of the above

**Pepper maggot (PM) (*Zonosemata electa*)**

19. Maggots reach about ½ inch in length over a period of about \_\_\_\_\_ weeks, and have no distinct head capsule. When they are ready to pupate, they exit at the blossom end, leaving tiny round exit holes. These holes allow for the entry of pathogens into the fruit.
- A. Two      C. Four  
B. Three      D. None of the above

**Seedcorn beetles (*Stenolophus lecontei*)**

20. Damage to corn seeds is more likely in cool, \_\_\_\_\_ when the seeds are slow to germinate but the insects are still actively feeding.
- A. Wet springs      C. Wet summers  
B. Dry springs      D. None of the above

**Topic 3 - Crop Chewing Insects Section – Post Quiz Part 3**

**Stem borers (Rice Destroyers)**

1. Striped stemborer is one of the most important insect pests in Asia. Its damage can be as high as \_\_\_\_\_% when severe.
- A. 20      C. 100  
B. 50      D. None of the above

**Squash vine borer (*Melittia satyriniformis*)**

2. The squash borer usually occurs in high numbers although their presence is usually not noticed until after damage is done.
- A. True      B. False
3. Eggs are flat, brown, and about \_\_\_\_\_ inch long.
- A. ½      C. 1/25  
B. ¾      D. None of the above

**Sweet Potato Weevil (*Cylas formicarius*)**

**Life Cycle and Description**

4. A complete life cycle requires one to two months, with \_\_\_\_\_ days being common during the summer months.
- A. 10 and 35      C. 7 to 10  
B. 35 to 40      D. None of the above

**Sweetpotato Whitefly - Silverleaf Whitefly (*Bemisia tabaci*)**

5. Adult whiteflies emerge through a \_\_\_\_\_-shaped slit in the integument of the last nymphal instar.
- A. C      C. V  
B. T      D. None of the above

### **Threecornered Alfalfa Hopper (*Spissistilus festinus*)**

6. The threecornered alfalfa hopper adult is a \_\_\_\_\_, robust, wedge-shaped insect with clear wings. The body is about 0.25 inch (6.4 mm) long, is higher and wider at the head and tapers towards the end.

- A. Brown      C. Bronze
- B. Green      D. None of the above

7. \_\_\_\_\_ are mobile whereas \_\_\_\_\_ cannot fly and are confined to the lower portions of the plant.

- A. Nymphs - Pre-pupa      C. Adults - Pre-pupa
- B. Adults - nymphs      D. None of the above

### **Thrips**

#### **Thrip Identification**

8. Immatures (called larvae or nymphs) are oblong or slender and elongate and lack wings.

- A. Nymphs      C. Larvae or nymphs
- B. Adults      D. None of the above

9. Thrips have several generations (up to about \_\_\_\_\_) a year. When the weather is warm, the life cycle from egg to adult may be completed in as short a time as \_\_\_\_\_ weeks.

- A. 4-3      C. 10 – 2
- B. 8 – 2      D. None of the above

### **Webworms (*Hyphantria cunea*)**

10. Caterpillars grow to about 1 inch long, with black or reddish heads, pale yellow or greenish bodies marked with a broad mottled stripe containing \_\_\_\_\_ (tubercles) down the back (one pair on each body segment) and yellowish patterns on the sides. They are covered with tufts of long whitish hairs.

- A. Two rows of green bumps      C. Two rows of black bumps
- B. Two rows of red bumps      D. None of the above

### **Bean Weevil (*Acanthoscelides obtectus*)**

#### **The location of eggs varies depending on the weevil:**

11. Which of the following eggs glued to the bean or the pod?

- A. Cowpea weevil      C. Broad bean weevil
- B. Bean weevil      D. None of the above

### **Weevils (Alfalfa and Egyptian Alfalfa)**

#### **Description of the Pest**

12. Adult weevils of both species are dark gray and about 0.2 inch. The legless larva of the alfalfa weevil is about 0.25 inch when fully grown. It is pale green with a thin white line down the center of the back and has a brown head.

- A. True      B. False

13. Larvae complete their growth in about \_\_\_\_\_ weeks. They will then spin a cocoon and pupate either in the leaves of the plant or on the ground.

- A. 1 to 2      C. 4 to 6
- B. 3 to 4      D. None of the above

14. Both weevils spend the summer as adults under the loose bark of trees, especially eucalyptus, or in any place they can wedge their bodies, such as in rough-barked trees (walnut) or under shake shingles on homes.  
A. True      B. False

### **Western Yellowstriped Armyworm (*Spodoptera Praefica*)**

#### **Eggs**

15. The eggs are \_\_\_\_\_ in color and bear 45–58 small ridges.  
A. Greenish white      C. Greenish to pinkish brown  
B. Golden brown      D. None of the above
16. In shape, the egg is a slightly flattened sphere, measuring 0.46–0.52 mm in diameter and 0.38–0.40 mm in height.  
A. True      B. False
17. Females typically deposit clusters of \_\_\_\_\_ eggs, usually on the underside of leaves. Total fecundity was determined to be over 3000 eggs under laboratory conditions.  
A. 100- 400      C. 500- 1,000  
B. 200–500      D. None of the above
18. The eggs are covered with scales from the body of the adults. Duration of the egg stage is \_\_\_\_\_ days at warm temperatures.  
A. 3 -5      C. 7-9  
B. 5-7      D. None of the above

#### **Pupae**

19. \_\_\_\_\_ pupate in the soil within a cell containing a thin lining of silk. The reddish brown pupa measures about 18 mm in length.  
A. Nymph      C. Larvae  
B. Adult      D. None of the above
20. Duration of the pupal stage is \_\_\_\_\_ days, normally averaging \_\_\_\_\_ days.  
A. 9-12, 12-15      C. 9-22, 12-18  
B. 5-7, 11-15      D. None of the above

## **Topic 4 - Hoppers Section**

1. Locusts are actually grasshoppers that develop \_\_\_\_\_ behaviors under optimum environmental conditions which involve the presence of large populations of grasshoppers.  
A. Gregarious      C. Independent  
B. Aggressive      D. None of the above
2. Female grasshoppers are comparatively \_\_\_\_\_ than their male counterparts.  
A. Smaller      C. Larger  
B. Equal      D. None of the above

3. \_\_\_\_\_ grasshoppers mostly hop and they have small and weak wings hence they cannot fly for long distances.
- A. Male                      C. Female  
B. Both sexes              D. None of the above

### **Locust Verses Grasshoppers**

4. The locust is a type of a grasshopper which is \_\_\_\_\_. The grasshopper is not a type of a locust. Both belong to the order Orthoptera.
- A. Short horned              C. Long winged  
B. Long horned              D. None of the above

### **Grasshopper Life Cycle**

5. Adult grasshoppers, the only stage with wings, can readily move out of hatching areas. Hoppers begin egg laying one to three weeks after reaching the adult stage and may live two to three months, depending on the late summer and early fall weather. All developmental stages are influenced by\_\_\_\_\_.
- A. Weather                      C. Moisture  
B. Food source                D. None of the above

### **Predator Avoidance**

6. Grasshoppers employ a wide range of mechanisms to keep from being eaten. The foremost of these is \_\_\_\_\_, matching the background in color or texture.
- A. Cryoiosist                  C. Caryopsis  
B. Crypsis                      D. None of the above

### **Locust and Grasshopper Insecticide Control Sub-Section**

7. \_\_\_\_\_ is the only insecticide among these that is used as bait to control grasshopper populations.
- A. Malathion    C. Carbaryl  
B. Dimilin        D. None of the above

### **Grasshopper Management Strategies**

8. Where populations are expected to be extreme, consider not planting a garden for a year (this may be the least frustrating solution to a very difficult situation) or plant early-maturing varieties or vegetables that are less attractive to grasshoppers (e.g. tomatoes and squash).
- A. True                      B. False

### **Locust Sub-Section**

9. The transition from the solitary phase in locusts is triggered by the secretion of the hormone \_\_\_\_\_ which has been linked to boosting moods in humans.
- A. Malathion                  C. Serotonin  
B. Estrone                      D. None of the above
10. The morphological structure of the locust does not differ from the grasshoppers. They are solitary animals but during \_\_\_\_\_ conditions, they form swarms. While in this form they transform their body shape, color, state of fertility, and behavior.
- A. Favorable                  C. Warm  
B. Unfavorable                D. None of the above

### **Migratory Phase**

11. During the migratory phase, locusts can fly for long distances as they have long and strong wings that can enable them to fly for long distances. They only feed on crops and vegetation for survival. In case there is an absence of vegetation where they are, then they will be forced to migrate.

- A. True      B. False

### **Locusts in the USA- Current Information**

12. There are currently 11 native species of **swarming** locusts in the US.

- A. True      B. False

### **Cricket Sub-Section**

13. Crickets belong to family Gryllidae, which is home to about 2,400 species of these chirpy insects. What most people do not know is that only female members of the family can produce this trademark chirping sound.

- A. True      B. False

### **Jerusalem Cricket (*Stenopelmatus fuscus*)**

14. This slow-moving, humpbacked insect is often mistaken for a spider. Six legs and only 2 eyes helps eliminate that as a possibility.

- A. True      B. False

### **Mormon Cricket (*Anabrus simplex*)**

15. Mormon cricket prefers grasses and sage brush, but will eat a variety of other plants, too, including wheat and corn. It also hangs out at where forests open up into fields in addition to cultivated agricultural areas and pasture lands. While this species does eat plant matter, sometimes it resorts to cannibalism when plant foods are scarce.

- A. True      B. False

### **Distribution and Habitat**

16. The Mormon cricket, a grasshopper and is a True cricket, lives in western North America in rangeland dominated by sagebrush and forbs.

- A. True      B. False

### **Katydid Sub-Section**

17. Katydids lay their eggs in the ground.

- A. True      B. False

### **Katydids—*Scudderia furcata* and *Microcentrum retinerve***

#### **Life cycle**

18. Katydids produce \_\_\_\_\_ generation(s) a year.

- A. 1            C. 3  
B. 40-60      D. None of the above

#### **Damage**

19. Katydids eat the whole fruit.

- A. True      B. False

## Solutions

20. In areas where there is good biological control, parasites often attack the eggs of katydids. Control is not usually necessary, but spinosad can be applied if nymphs are numerous when fruit are small.

- A. True      B. False

## Topic 5 – Plant Sucking Insects – Part 1

1. Characteristics of Hemiptera include: Antennae are fairly long and contain \_\_\_\_\_ segments

- A. 2 -3      C. 4-5  
B. 6-8      D. None of the above

### Aphid (Aphidoidea) Sub-Section

2. Aphids are members of the superfamily, called?

- A. Orthoptera      C. Aphidoidea  
B. Plecoptera      D. None of the above

### Aphids Sociability

3. The soldiers of gall-forming aphids also carry out the job of \_\_\_\_\_.

- A. Protecting the clan      C. Mating with the queens  
B. Cleaning the gall      D. None of the above

### Aphid Control Sub-Section

4. What is the key to reducing aphid infestations?

- A. Early detection      C. Crushed by hand or removed by pruning  
B. Chemical treatment      D. None of the above

### Insecticide Control of Aphids

5. One large, heavily infested rose bush may take two applications of \_\_\_\_\_ adult lady beetles each.

- A. 100      C. 50  
B. 1,500      D. None of the above

### Avocado Bud Mites (*Tegolophus perseiflorae*)

6. A few miticides are registered for use on avocados when fruit is present. \_\_\_\_\_ sprays are recommended.

- A. Sulfur or oil emulsion      C. Dursban (chlorpyrifos)  
B. Sevin (carbaryl)      D. None of the above

### Avocado Thrips (*Scirtothrips perseae*)

7. Adult avocado thrips are \_\_\_\_\_ in color, the abdomens may appear \_\_\_\_\_ because of the chlorophyll extracted from plant material during feeding.

- A. Straw yellow - greenish      C. Grayish black - white  
B. Bordello blue - purplish      D. None of the above

8. Avocado thrips are readily distinguishable from another pest thrips in avocados, the greenhouse thrips, which are much \_\_\_\_\_ in color.

- A. Larger and black      C. Longer and yellowish  
B. Smaller and black      D. None of the above

### **Cicada Sub-Section**

9. These invertebrates that have captured the fascination of many cultures for thousands of years are incredibly unique creatures. There are more than \_\_\_\_\_ cicada species, all of which can be separated into \_\_\_\_\_ categories.

- A. 1,000 - 3
- B. 3,000 - 2
- C. 300 - 4
- D. None of the above

### **Periodical Cicadas**

10. Periodical cicadas are found only in eastern North America. There are seven species — four with \_\_\_\_\_-year life cycles and three with \_\_\_\_\_-year cycles.

- A. 7- 11
- B. 13 -17
- C. 13 - 21
- D. None of the above

### **Leafhoppers (Cicadellinae) Sub-Section**

11. Identification: Adult leafhoppers range in size from \_\_\_\_\_ inch long.

- A. 1/8 to ¼
- B. ¼ -3/8
- C. ½ - 3/4
- D. None of the above

12. Which of the following feeds on legumaceous plants like alfalfa, as well as on apple, birch, chestnut, maples, and others? Species in the genus, Erythroneura, feed on sycamore leaves, but also on apple, grape and willow.

- A. Potato leafhopper
- B. Rose leafhopper
- C. Aster or six-spotted leafhopper
- D. None of the above

13. Which of the following feeds on vegetables and annual flowers and spreads the aster yellows virus to woody plants like periwinkle and Thunbergia species?

- A. Potato leafhopper
- B. Rose leafhopper
- C. Aster or six-spotted leafhopper
- D. None of the above

### **Symptoms and Diagnosis**

14. Which of the following have a lacy pattern on their upper side, they don't jump or run sideways, and they are about half as broad as they are long? Yet another pest that can cause stippling is the spider mite. Check under leaves for the webbing left by spider mites (leafhoppers don't leave webbing).

- A. Leafhoppers
- B. Lacebugs
- C. Grasshoppers
- D. None of the above

### **Planthoppers (Issus) Sub-Section**

15. Which of the following have an enlarged pronotum (shield-like part just behind the head) that extends backward to cover the abdomen; often it is shaped to resemble a thorn or wart on a twig?

- A. Leafhoppers
- B. Treehoppers
- C. Spittlebugs and froghoppers
- D. None of the above

16. Which of the following have 1 or more rows of small spines on the hind tibiae (shin-like segments)? Their bodies tend to be parallel-sided or taper toward the rear.

- A. Leafhoppers
- B. Treehoppers
- C. Spittlebugs and froghoppers
- D. None of the above

17. Which of the following are a lot like leafhoppers but have only 1 or 2 stout spines on the hind tibiae (shin-like segments), plus a small ring of spines at the outer tip of that leg segment? Many species' bodies are widest at the hind end (a little like a resting frog, hence the name froghopper).

- A. Flatid planthoppers
- B. Treehoppers
- C. Spittlebugs and froghoppers
- D. None of the above

18. Which of the following are usually not abundant enough to cause real damage to the health of ornamental plants? Their waxy secretions and the honeydew they excrete disfigure plants and make them sticky to touch.

- A. Flatid planthoppers
- B. Treehoppers
- C. Spittlebugs and froghoppers
- D. None of the above

19. Which of the following may grow in the honeydew, further disfiguring infested plants?

- A. Fungus
- B. Scale
- C. Sooty mold
- D. None of the above

20. Ecology and Behavior: Planthoppers generally have \_\_\_\_\_ generations per year; however, as many as \_\_\_\_\_ generations per year have been observed in tropical delphacids.

- A. 1 -3 – 12
- B. 2-5 - 50
- C. 2-6 - 21
- D. None of the above

## Topic 6 – Plant Sucking Insects Section –Part 2

### Spider Mites and Predatory Mites Sub-Section

1. Spider mites and predatory mites are tiny \_\_\_\_\_ legged arthropods (larval stages have \_\_\_\_\_ legs).

- A. 8 - 4
- B. 6 -6
- C. 8 - 6
- D. None of the above

### Persea Mite Life Cycle

2. Persea mite populations are suppressed, and their numbers may decline rapidly, when the daily high temperature is \_\_\_\_\_°F or more on several consecutive days and humidity is low.

- A. 90
- B. 80
- C. 100
- D. None of the above

### Spittlebugs (Froghoppers) Sub-Section

3. Spittlebugs are the immature stage of several insect species known as froghoppers. Though many types of spittlebugs affect gardens, these froghopper nymphs all have one thing in common: the spittle-like \_\_\_\_\_ that conceals and protects them as they feed on plants.

- A. Foam
- B. Scale
- C. Spray
- D. None of the above

### Identification

4. Spittlebug nymphs have \_\_\_\_\_ on the sides of their heads.  
A. Red stripes      C. Black spots above the eyes  
B. Large red eyes      D. None of the above

### Common Spittlebugs

5. Which of the following spittlebugs feeds primarily on broadleaved herbaceous plants, but it also occurs on woody, deciduous species? At least 400 hosts are known. Adults are robust and blackish, brown, tan, yellow, or a mottled mix of these colors.  
A. Meadow spittlebug      C. Western pine spittlebugs  
B. California spittlebug      D. None of the above

### Stink Bugs Sub-Section

6. Stink bug nymphs are not very mobile and remain in the vicinity of the egg cluster through the \_\_\_\_\_ growth stage (for about 2 weeks).  
A. Fourth      C. Second  
B. Third      D. None of the above
7. Large nymphs that are dull yellow/tan are?  
A. Green stink bug      C. Southern green stink bug  
B. Brown stink bug      D. None of the above

### Identifying Brown Marmorated Stink Bugs

8. The adult brown marmorated stink bug is shield shaped with brown mottling. It is between 14 and 17 mm long, roughly the size of a?  
A. Quarter      C. Dime  
B. Nickel      D. None of the above
9. Adult brown marmorated stink bug usually produces \_\_\_\_\_ generations per year in cooler climates but can lay up to \_\_\_\_\_ generations per year in warmer climates.  
A. 3-4, - 7      C. 5-6, - 12  
B. 1-2,- 5      D. None of the above

### Squash bugs (*Anasa tristis*)

10. The squash bug spends the \_\_\_\_\_ in the \_\_\_\_\_ stage.  
A. Winter – Adult      C. Summer - adult  
B. Winter – Nymph      D. None of the above

### Tarnished Plant Bugs (*Lygus lineolaris*)

11. Tarnished plant bugs generally have \_\_\_\_\_ generations depending upon the weather.  
A. 2-4      C. 3-4  
B. 4-6      D. None of the above
12. Tarnished plant bugs nymphs develop through \_\_\_\_\_ instars before becoming adults.  
A. 3      C. 4  
B. 5      D. None of the above

### Treehoppers

13. Which of the following adults and last instars are about 2/5 inch long. Nymphs have prominent spines on the back, which is characteristic of treehopper nymphs? Host plants include ash, elm, fruit trees, hawthorn, locust, poplar, and many herbaceous plants (e.g., tomatoes and peppers).

- A. Oak treehopper
- B. Buffalo treehopper
- C. Threecornered alfalfa hopper
- D. None of the above

14. Which of the following feed in grapes vectors Grapevine red blotch associated virus?

- A. Oak treehopper
- B. Buffalo treehopper
- C. Threecornered alfalfa hopper
- D. None of the above

### Thrips Sub-Section

15. Thrips Life Cycle: Thrips eggs hatch after \_\_\_\_\_ days, and the nymphs then feed for \_\_\_\_\_ weeks before resting to molt in \_\_\_\_\_ weeks.

- A. 1-2, 1-3, 2-4
- B. 1-3 3-7, 3-4
- C. 3-5, 1-3, 1-2
- D. None of the above

### Whiteflies Sub-Section

16. Which of the following adults are 0.8-1.2 millimeter long with white wings (without markings) and pale yellow bodies? The wings are held in a roof like position (about a 45-degree angle) over their bodies, whereas other whiteflies typically hold the wings nearly flat when at rest. As a result, appears more slender than other common whiteflies.

- A. Citrus blackfly
- B. Silverleaf Whitefly
- C. Banded winged Whitefly
- D. None of the above

17. Which of the following wings are held nearly parallel to the leaf and cover the abdomen when at rest? Eggs are occasionally laid in circular patterns on plants with smooth leaves. Eggs are oblong, smooth and are initially yellow but darken before hatching.

- A. Greenhouse Whitefly
- B. Silverleaf Whitefly
- C. Banded winged Whitefly
- D. None of the above

18. Which of the following is an occasional pest of crops and ornamental plants, especially hibiscus? The adults are slightly larger than silverleaf and greenhouse whiteflies. They can be recognized by two irregularly shaped (in zig-zag pattern) gray bands on the front pair of wings. Except for these banded front wings, the adults are very similar in size and shape to adult greenhouse whiteflies.

- A. Citrus blackfly
- B. Silverleaf Whitefly
- C. Banded winged Whitefly
- D. None of the above

### Biological Control

19. *Delphastus pusillus* is the most whitefly-specific predator available. It feeds primarily on whitefly eggs but may also consume nymphs. It is particularly useful in reducing whitefly populations in greenhouses, although it may also be used outside. Recommended release rates are \_\_\_\_\_ per m<sup>2</sup> (10 ft.<sup>2</sup>).

- A. 7-10
- B. 30 -40
- C. 70 -100
- D. None of the above

20. Eretmocerus eremicus is the most effective parasitoid available for biological control of \_\_\_\_\_, while Encarsia formosa is effective for treating the \_\_\_\_\_.
- A. Greenhouse Whitefly - Silverleaf whitefly
  - B. Banded winged Whitefly - Silverleaf whitefly
  - C. Silverleaf Whitefly - Greenhouse Whitefly
  - D. None of the above

## Topic 7 – Stinging Insects Section

### Yellowjackets

1. The solitary wasps \_\_\_\_\_ become a problem. Solitary means they do not colonize or form nests where many wasps live together.
- A. Rarely
  - C. Never
  - B. Always
  - D. None of the above
2. Which of the following feeds abundantly on armyworms, corn earworms and other ag pests. Hornets will take house flies, blow flies and caterpillars?
- A. Mud Daubers
  - C. German yellowjacket
  - B. Paper wasp
  - D. None of the above

### Vespula

3. These wasps tend to be medium sized and black with jagged bands of bright yellow—or white in the case of the aerial-nesting D. (formerly known as V.) maculata—on the abdomen and have a very short, narrow “waist,” the area where the thorax attaches to the abdomen..
- A. True
  - B. False

### Eastern Yellowjacket (Vespula maculifrons)

4. Workers are slightly smaller than most yellowjackets, but colony size can number around \_\_\_\_\_ or more individuals.
- A. 500
  - C. 5,000
  - B. 50
  - D. None of the above

### German Yellowjacket (Vespula germanica)

5. In Europe, German yellowjacket nests are \_\_\_\_\_, but in North America the vast majority of reported nests are in structures.
- A. Subterranean
  - C. Aerial
  - B. Rare
  - D. None of the above
6. Colonies of this yellowjacket may be active in protected voids into January and February when outside temperatures are not severe.
- A. True
  - B. False

### Paper Wasp

7. The paper wasp populations in these nests rarely ever exceed \_\_\_\_\_.
- A. 200
  - C. 500
  - B. 1,000
  - D. None of the above

**Bald Faced hornet**

8. A full-sized Bald Faced hornet nest consists not of a single umbrella comb like the \_\_\_\_\_, but four to six wide circular combs -- one hanging below the other and all enclosed with an oval paper envelope consisting of several insulating layers.

- A. Mud Daubers
- C. German yellowjacket
- B. Paper wasp
- D. None of the above

9. Cypermethrin is available only in liquid forms.

- A. True
- B. False

10. Either formulation can be used; Demon EC, Cynoff EC are professional liquid concentrates and Demon WP, Cynoff WP are professional wettable powder concentrates.

- A. True
- B. False

11. Once you have sprayed the area (or areas), make note of the wasp population over the next \_\_\_\_\_ days. A repeat application might be necessary.

- A. 7 -10
- C. 10 – 14
- B. 30-45
- D. None of the above

**Other Wasps**

12. Which of the following can usually be found in sandy areas as their name suggests? The females build large tunnels and feed on flies. The adults are stout-bodied; gray or black with pale to bright yellow markings.

- A. Cricket Wasps
- C. Digger Wasps
- B. Sand wasp
- D. None of the above

13. Which of the following usually have small nests and are usually inhabited by about 250 wasps? Unlike many other wasps and yellowjackets.

- A. Cricket Wasps
- C. Digger Wasps
- B. Umbrella wasps
- D. None of the above

14. Which of the following do not have a worker caste? All female wasps are capable of becoming the queen.

- A. Cricket Wasps
- C. Umbrella wasps
- B. Blue Mud Wasp
- D. None of the above

15. Which of the following are the fertile female which starts the colony and lays eggs?

- A. Queen
- C. New queens
- B. Drones
- D. None of the above

16. Which of the following are infertile females which do all work except laying eggs?

- A. Workers
- C. New queens
- B. Drones
- D. None of the above

17. Which of the following are males, which have no stingers, and are born from unfertilized eggs?

- A. Workers
- C. New queens
- B. Drones
- D. None of the above

18. Which of the following are fertile females, each of which, once fertilized, may start its own nest in the spring?

- A. Workers
- C. New queens
- B. Drones
- D. None of the above

19. Characteristics of Hemiptera include that most species are \_\_\_\_\_ but some are

- A. Terrestrial – Aquatic
- C. Social – Independent
- B. Crawlers – Flyers
- D. None of the above

20. Characteristics of Hemiptera include that the \_\_\_\_\_ ones are beneficial to man

- A. Carnivorous
- C. Social – Independent
- B. Predacious
- D. None of the above

## Topic 8 -Soil Insects Section

### Billbugs (snout beetles)

1. Billbugs and white grubs are insects that damage turf grasses by feeding on the \_\_\_\_\_.

- A. Stem
- C. Roots
- B. Leaves
- D. None of the above

### Carrot Rust Fly (*Chamaepsila rosae*)

2. Carrot rust flies overwinter as \_\_\_\_\_ in the soil near the host plant, or sometimes as larvae within carrot roots.

- A. Larvae
- C. Adults
- B. Pupae
- D. None of the above

3. The carrot rust fly has \_\_\_\_\_ generations per year, with the second generation emerging in July.

- A. 1 to 5
- C. 1 to 3
- B. 1 to 4
- D. None of the above

### Click Beetles (Wireworms)

4. Biology varies by species. In general, \_\_\_\_\_ overwinter in the ground, becoming active in the spring.

- A. Larvae
- C. Adults
- B. Adults and larvae
- D. None of the above

5. They pupate in the cells within the soil in late \_\_\_\_\_, and emerge as adults a few weeks thereafter. Generations can greatly overlap.

- A. Spring or summer
- C. Fall or winter
- B. Summer or fall
- D. None of the above

### **Corn Rootworm (4 Primary species)**

#### **Appearance**

6. Which rootworm beetles are pale yellow to tan when they first emerge from the soil but soon darken to light green? They are about ¼ inch long.
- A. Northern corn      C. Western corn  
B. Southern corn      D. None of the above

#### **Ground Beetles**

7. Ground beetles hide during the day and are found on the ground under leaves, logs, stones, loose bark and in grassy areas.
- A. True      B. False

#### **Horsehair worms**

8. Horsehair or gordian worms are dangerous to people in all stages of their lives.
- A. True      B. False

#### **May and June beetles (Phyllophaga spp., Polyphylla spp.)**

9. Females, less attracted to lights, tunnel \_\_\_\_\_ inches into the soil and deposit eggs.
- A. 3 to 4      C. 2 to 5  
B. 3 to 6      D. None of the above

10. In \_\_\_\_\_ weeks, small grubs (larvae) hatch from eggs and develop through three stages (instars), with the first two stages lasting about 3 weeks.
- A. 3 to 4      C. 2 to 5  
B. 3 to 6      D. None of the above

#### **Mole crickets**

11. The tawny mole cricket is grayish brown with four pale spots on the pronotum, while the southern mole cricket is often golden brown with a mottled brown pronotum.
- A. True      B. False

#### **Nematodes**

12. Which of the following eat all types of nematodes and protozoa?
- A. Omnivores      C. Predatory nematodes  
B. Bacteria and fungi      D. None of the above

13. When nematodes eat bacteria or fungi, ammonium (NH<sub>4</sub><sup>+</sup>) is released because \_\_\_\_\_ contain much more nitrogen than the nematodes require.
- A. Omnivores      C. Predatory nematodes  
B. Bacteria and fungi      D. None of the above

#### **Scarab beetles**

14. In several scarab beetles species, only the females have pointy horns. Several species are quite small.
- A. True      B. False
15. Scarab beetles' larvae of most scarab beetles are brownish, S-shaped grubs that live underground or in other protected places.
- A. True      B. False

**Southwestern masked chafer (Cyclocephala hirta)**

16. Mated females dig down four to six inches and lay \_\_\_\_\_ eggs. If soil moistures are sufficient, the eggs swell within eight days and hatch in 14 to 18 days at 70 to 75°F.

- A. 11 to 14
- B. 20 to 25
- C. 5 -7
- D. None of the above

**Sowbugs aka Pillbugs**

17. Pillbugs have no posterior appendages and can roll up into a tight ball when disturbed, for which they are sometimes called "roly-polies".

- A. True
- B. False

**Springtails - Collembola**

18. Juvenile Collembola grow and undergo \_\_\_\_\_ molts before they become sexually mature.

- A. 1-4
- B. 3-12
- C. 2-5
- D. None of the above

**Wood Cockroaches**

19. The wings of the wood roach females extend slightly beyond the tip of the abdomen. The males' wings cover only half of the abdomen, and nymphs are winged.

- A. True
- B. False

20. Wood roach males are poor fliers. Sometimes females fly into buildings.

- A. True
- B. False

**Topic 9 - Worker Protection Standard Introduction Section**

**Employers covered by the WPS must:**

1. Reduce overall exposure to pesticides by prohibiting \_\_\_\_\_ from exposing \_\_\_\_\_ during pesticide application.

- A. Owners - Handlers
- B. Handlers- Workers
- C. Handlers - Applicators
- D. None of the above

2. Mitigate exposures by requiring decontamination supplies be present and emergency assistance be available.

- A. True
- B. False

**WPS Requirements 2015-2018**

3. First-time ever minimum age requirement: Children under \_\_\_\_\_ are prohibited from handling pesticides.

- A. 16
- B. 18
- C. 21
- D. None of the above

4. New no-entry application-exclusion zones up to \_\_\_\_\_ feet surrounding pesticide application equipment will protect workers and others from exposure to pesticide overspray.

- A. 100
- B. 1,000
- C. 500
- D. None of the above

**Central Location**

5. You will still need to keep pesticide application information for \_\_\_\_\_ days at the central location and the pesticide safety information (poster).  
A. 30            C. 15  
B. 60            D. None of the above

**Four Basic WPS Requirements Subsection**

**These regulations contained four basic requirements:**

6. Workers are not to be sprayed with pesticides unless necessary.  
A. True            B. False

**General Duties of WPS**

The general duties of the WPS require an agricultural employer or a pesticide handler-employer to:

7. Assure that each worker and handler subject to the standard receives the \_\_\_\_\_.  
A. Provisions of this standard            C. Labeling of the pesticide  
B. Required protections            D. None of the above
8. Which of the following prohibit agricultural and handler employers from taking any retaliatory actions against workers attempting to comply with this standard, or from taking any action that prevents or discourages any worker or handler from complying or attempting to comply with the WPS?  
A. The general duties            C. Labeling of the pesticide  
B. Required protections            D. None of the above

**WPS Protection**

9. To ensure that employees will be protected from exposures to pesticides, the WPS requires employers to prohibit handlers from applying a pesticide in a way that will expose \_\_\_\_\_.  
A. Workers or other persons            C. Monitoring levels  
B. Inadvertent exposures            D. None of the above

**Mitigation**

10. To mitigate pesticide exposures that employees receive, the WPS \_\_\_\_\_:  
**Decontamination supplies** — providing handlers and workers an ample supply of water, soap, and towels for routine washing and emergency decontamination.  
A. Requires            C. Suggests  
B. Recommends            D. None of the above

## Topic 10- PPE, Safety and Health Section

### Personal Protective Equipment (PPE)

1. Which of the following must supply handlers with personal protective equipment (PPE) as required by the pesticide label. All PPE should be stored in an area separate from pesticides?

- A. Applicators      C. Employers
- B. Handlers        D. None of the above

2. When the PPE requirement falls under the WPS, the employer has the following responsibilities:

Prevent any \_\_\_\_\_ from wearing or taking home contaminated PPE, unless proper instructions have been given regarding the washing and care of PPE.

- A. Person            C. Worker
- B. Handler         D. None of the above

### §170.240 Personal Protective Equipment

3. Requirement. Any \_\_\_\_\_ who performs tasks as a pesticide handler shall use the clothing and personal protective equipment specified on the labeling for use of the product.

- A. Handler            C. Worker
- B. Person            D. None of the above

### Personal Protective Equipment Requirements      Citation 28 &33.a.

4. Any contaminated PPE must be can be washed with any other clothing or laundry. PPE is not considered contaminated with any use around pesticides or in a treated area.

- A. True                B. False

5. Early-entry workers and pesticide handlers can use their vehicle for pesticide storage and pesticide changing areas where they can put on, remove and store their PPE. They are allowed to wear home or to take home PPE they have used.

- A. True                B. False

### §170.507 Personal Protective Equipment Rule

6. The spray applicator must ensure that the personal protective equipment is clean and in proper operating condition.

- A. True                B. False

7. Long-sleeved shirts, short-sleeved shirts, long pants, short pants, shoes, and socks are not considered personal protective equipment, although such work clothing must be worn if required by the pesticide product labeling.

- A. True                B. False

### Prevention, Recognition, First Aid Treatment of Heat-Related Illness

8. Which of the following is a medical emergency that may result in death? Call 911 immediately.

- A. Heat cramps      C. Tired muscles
- B. Heat stroke      D. None of the above

9. Which of the following is those used for performing the work—are usually the ones most affected by cramps. Cramps may occur during or after working hours?

- A. Heat cramps      C. Tired muscles
- B. Heat rash        D. None of the above

10. Which of the following is also known as prickly heat, is skin irritation caused by sweat that does not evaporate from the skin?

- A. Heat cramps      C. Tired muscles
- B. Heat rash        D. None of the above

## Topic 11 - WPS Required Training Section

### §170.401 Training Requirements for Workers

1. General requirement. Before any worker performs any task in a treated area on an agricultural establishment where within the last \_\_\_\_\_ days a pesticide product has been used or a restricted-entry interval for such pesticide has been in effect, the agricultural employer must ensure that each worker has been trained in accordance with this section within the last \_\_\_\_\_ months.

- A. 60 – 6      C. 30 – 12
- B. 30 – 6      D. None of the above

### §170.405 Entry Restrictions Associated with Pesticide Applications

2. The application exclusion zone is the area that extends \_\_\_\_\_ feet horizontally from the application equipment in all directions during application when the pesticide is applied.

- A. 100      C. 500
- B. 50        D. None of the above

3. The application exclusion zone is the area that extends \_\_\_\_\_ feet horizontally from the application equipment in all directions during application when the pesticide is applied not as in §170.405(a)(1)(i)(A)-(D) and is sprayed from a height of greater than \_\_\_\_\_ inches from the planting medium using a spray quality (droplet spectrum) of medium or larger (volume median diameter of 294 microns or greater).

- A. 50 – 6      C. 25 – 6
- B. 25 – 12    D. None of the above

### Worker Training 2018

4. The pesticide safety training for workers under the revised WPS (subparts D, E, F and G of 40 CFR Part 170) must be presented orally at a location that is reasonably loud during work.

- A. True            B. False

5. The responsibility of agricultural employers to provide workers and handlers with a paycheck and not information and protections designed to reduce work-related pesticide exposures and illnesses.

- A. True            B. False

6. A worker or handler may designate in writing a representative to request access to pesticide application and hazard information.

- A. True            B. False

**2018 Handler Training Citations. 27-37.**

7. Handlers must be at least \_\_\_\_\_ years old.

- A. 16
- B. 18
- C. 21
- D. None of the above

**Pesticide Safety, Application and Hazard Information**

8. The EPA WPS safety poster (or equivalent) where decontamination supplies are located at permanent sites and where decontamination supplies are provided for \_\_\_\_\_ or more workers. 170.311 (a)(5)

- A. 11
- B. 25
- C. 15
- D. None of the above

9. Display the EPA WPS safety poster or equivalent information before an application takes place and for \_\_\_\_\_ days after the REI expires. 170.309 (h)

- A. 10
- B. 15
- C. 30
- D. None of the above

10. Display the SDS and application information within \_\_\_\_\_ hours of the application and before workers enter treated areas. This information must be displayed for \_\_\_\_\_ days after the REI expires and kept in records on the agricultural establishment until \_\_\_\_\_ years after the REI expires. 170.309 (h)&(l) and 170.311 (b)(5)-(6)

- A. 24 – 10 -5
- B. 12- 30- 3
- C. 24 – 30 - 2
- D. None of the above

11. Provide the SDS and application information upon request of a worker, handler, designated representative or medical personnel, within \_\_\_\_\_ days. 170.311 (b)(7)-(9)

- A. 10
- B. 15
- C. 30
- D. None of the above

**Decontamination Supplies**

12. Establish accessible decontamination supplies located together within \_\_\_\_\_ mile of all **workers** (when required 170.411 (c)) and **handlers**. 170.411 and 170.509

- A. ¼
- B. 1
- C. ½
- D. None of the above

13. When a product requires protective eyewear for **handlers**, and/or when using a closed system under pressure, provide the following in mixing and loading areas: a system that can deliver gently running water at \_\_\_\_\_ gallons per minute for at least \_\_\_\_\_ minutes or \_\_\_\_\_ gallons of water in containers suitable for providing a gentle eye-flush for about 15 minutes. 170.509 (d)(1)

- A. 10 – 15 – 6
- B. 0.4 – 5 – 1
- C. 0.4 – 15 – 6
- D. None of the above

14. When applying a product that requires protective eyewear, provide \_\_\_\_\_ pint(s) of water per **handler** in portable containers that are immediately available to each handler. 170.509 (d)(2)

- A. 3
- B. 1
- C. 5
- D. None of the above

**Emergency Assistance**

15. If there is reason to believe a worker or handler has been exposed to pesticides, during or within \_\_\_\_\_ hours of employment, and needs emergency medical treatment, employers must promptly make transportation available to an appropriate emergency medical facility.

- A. 72
- B. 24
- C. 48
- D. None of the above

**Application Restrictions and Monitoring 170.505**

16. When anyone is handling a highly toxic pesticide with a skull and crossbones, maintain sight or voice contact every \_\_\_\_\_ hours.

- A. 2
- B. 4
- C. 1
- D. None of the above

**Anti-Retaliation**

17. Employers must not retaliate against a worker or handler who attempts to comply with the WPS, files a complaint, or provides information in an investigation of alleged WPS noncompliance unless the employee is a troublemaker.

- A. True
- B. False

**Personal Protective Equipment**

18. Any person handling a pesticide must use the clothing and PPE specified on the label for \_\_\_\_\_.

- A. Handling activity
- B. Product use
- C. Type of PPE
- D. None of the above

**Decontamination**

19. A \_\_\_\_\_ must provide a decontamination site (as specified in the standard) for washing off pesticides and pesticide residues during any handling activity.

- A. Handler employer
- B. Worker
- C. Owner
- D. None of the above

**§170.309 Agricultural Employer Duties 2015-2018 Rule**

20. Agricultural employers must: Provide emergency assistance in accordance with this paragraph. If there is reason to believe that a worker or handler has experienced a potential pesticide exposure during his or her employment on the agricultural establishment or shows symptoms similar to those associated with acute exposure to pesticides during or within \_\_\_\_\_ hours after his or her employment on the agricultural establishment, and needs emergency medical treatment, the agricultural employer must do all of the following promptly after learning of the possible poisoning or injury:

- A. 10
- B. 72
- C. 24
- D. None of the above

**California DPR Requirement**

The Assignment must be submitted to TLC by December 27 in order to be submitted to DPR by the 30th. If it is late, you will be penalized \$50 per day.



## Agricultural Applicator Assignment #2 - H-M Last Names

You will have 90 days from the start of this course to have successfully passed this assignment with a score of 80%. You may e mail the answers to TLC, info@tlch2o.com or fax the answers to TLC, (928) 272-0747. This assignment is available to you in a Word Format on TLC's Website. You can find online assistance for this course on the in the Search function on Adobe Acrobat PDF to help find the answers. Once you have paid the course fee, you will be provided complete course support from Student Services (928) 468-0665.

**Write your answers on the Answer Key found in the front of this assignment.**

We will require all students to fax or e-mail a copy of their driver's license with the registration form.

Multiple Choice, Please select one answer and mark it on the answer key. The answer must come from the course text. (s) Means answer can be plural or singular.

### Topic 1 - Crop Chewing Insects Section – Part 1

#### Alfalfa Caterpillar (*Colias eurytheme*)

1. Larva / caterpillar: This larva is a grass-green color with a fine white stripe on each side of the body. The \_\_\_\_\_ has a very fine red line running through it.

- A. White stripe
- B. Black stripe
- C. Yellow stripe
- D. None of the above

2. Larvae feed for \_\_\_\_\_ + weeks.

- A. 3
- B. 2
- C. 4
- D. None of the above

#### Beet Armyworm (*Spodoptera exigua*)

3. Older caterpillars are green to almost \_\_\_\_\_ with stripes along each side.

- A. Yellow
- B. Black
- C. White
- D. None of the above

#### Blister Beetles (Insecta: Coleoptera: Meloidae)

4. The striped blister beetle, *Epicauta vittata*, has the typical cylindrical body shape. Beetles are from 1/3 to 2/3 inches long. Their bodies are \_\_\_\_\_ colored with three dark (black) stripes on each wing cover (elytron). The two stripes in the middle of the back continue onto the thorax and often onto the head. The eyes are black or dark grey.

- A. Tan to amber
- B. Brown to black
- C. Orange to red
- D. None of the above

5. All of these beetles contain the blistering agent "cantharidin" in their hemolymph (the \_\_\_\_\_ of insects).

- A. Blood
- B. Sap
- C. Liquid
- D. None of the above

6. Cantharidin is produced only by \_\_\_\_\_ blister beetles and is stored until mating. Thus, mating status determines whether \_\_\_\_\_ contain the toxin.

- A. Male – Male
- B. Female - Male
- C. Males – Females
- D. None of the above

**Boil Weevil (*Anthonomus grandis*)**

7. *A. grandis* spends the \_\_\_\_\_ in an adult reproductive dormancy where it subsists without food until it returns to cotton in the early \_\_\_\_\_.
- A. Spring – Winter    C. Summer - Fall  
B. Winter – Spring    D. None of the above

**Cabbage Looper (*Trichoplusia ni*)**

8. Larvae: Young larvae initially are \_\_\_\_\_, but become \_\_\_\_\_ as they commence feeding on foliage. They are somewhat hairy initially, but the number of hairs decreases rapidly as larvae mature.
- A. Dusky white - pale green                      C. Dusky white – light brown  
B. Pale green - dusky white                      D. None of the above

**Celery Leaf-tier (*Udea rubigalis*)**

9. There can be \_\_\_\_\_ generations per year in the garden; more in a greenhouse. Celery leaf-tiers are found throughout North America.
- A. 10                      C. 4  
B. 7                      D. None of the above

**Clover Root Curculio (*Sitona hispidulus* F.)**

10. The clover root curculio life cycle is similar to alfalfa weevil in that the adults leave the alfalfa fields and spend the \_\_\_\_\_ in protected areas.
- A. Winter    C. Spring  
B. Summer    D. None of the above

**Cotton Bollworm (*Helicoverpa armigera*)**

11. The adult is a large-sized, brown-colored moth and is seen infrequently throughout the day during periods of heavy infestations.
- A. True    B. False
12. Eggs are the size of a pinhead, white to cream colored and hatch in \_\_\_\_\_ days during warm weather.
- A. 2 to 3    C. 3 to 4  
B. 3 to 6    D. None of the above

**Cucumber Beetle**

13. Adult striped cucumber beetle has a \_\_\_\_\_ head and antennae.
- A. Red    C. Yellow  
B. Black    D. None of the above

**Cutworms**

14. The larvae are dingy, grayish-black and smooth-skinned and may reach \_\_\_\_\_ inches in length.
- A. 3    C. 2  
B. 1    D. None of the above

**Earwig (*Forficula auricularia*)**

15. Adults overwinter in the soil. Females lay \_\_\_\_\_ cream-colored eggs in underground nests during January and February, and the newly hatched young (nymphs) first appear in April.

- A. 20-50      C. 500-1,000
- B. 100-500    D. None of the above

**Earworms and hornworms**

**Corn Earworm (CEW) and Tomato Fruit Worm**

16. Adults of most hornworms (including the “tomato” hornworms) fly after dawn and are always observed except occasionally at porch lights.

- A. True      B. False

**European Corn Borer (*Ostrinia nubilalis*)**

17. Eggs are deposited in irregular clusters of about \_\_\_\_\_. The eggs are oval, flattened, and creamy white in color, usually with an iridescent appearance. The eggs darken to a beige or orangish tan color with age.

- A. 15 to 20    C. 20-50
- B. 50 -100    D. None of the above

18. Male moths are pale yellow to light brown in color, with both the forewing and hind wing crossed by dark zigzag lines and bearing pale, often yellowish, patches.

- A. True      B. False

19. The female is darker in color, usually pale brown or grayish brown, but also with dark zigzag lines and yellowish patches.

- A. True      B. False

20. Moths are most active during the first three to five hours of darkness.

- A. True      B. False

**Topic 2 - Crop Chewing Insects Section – Post Quiz Part 2**

**Flea Beetles (Scientific Name: *Varies* Order: Coleoptera)**

1. Flea beetles can be red, yellow to metallic gray.

- A. True      B. False

**Life History**

2. In the \_\_\_\_\_, the adults migrate out of their overwintering site as soon as adequate vegetation is available for feeding and egg deposition.

- A. Spring      C. Summer
- B. Winter      D. None of the above

**Flea Weevil**

3. Adults emerge later in the \_\_\_\_\_ and feed until fall.

- A. Spring      C. Summer
- B. Winter      D. None of the above

**Four-lined Plant Bug (Poecalocapsus linectus)**

4. Nymphs feed for about \_\_\_\_\_ days and do most of the damage because they are relatively immobile compared to adults.
- A. 60                      C. 45  
B. 30                      D. None of the above

**Fruit fly / Drosophila Flies**

5. The spotted wing drosophila, *D. suzukii*, is a new exotic pest of California and has been reported to infest undamaged, soft-skinned fruits such as cherry, raspberry, blackberry, strawberry, and blueberry.
- A. True                      B. False

**Fungus gnats (Orfelia and Bradysia species)**

6. Physical characteristics: The adults are tiny, flying insects about 1/16 to 1/8 inch long. They look a little like small mosquitoes with gray bodies and long, slender legs. The wings are usually clear. The insects have \_\_\_\_\_ that are larger than their \_\_\_\_\_.
- A. Head - segmented antennae                      C. Segmented antennae - Body  
B. Segmented antennae – Head                      D. None of the above

**Ground Mealybug (Rhizoecus kondonis)**

7. The best place to monitor for ground mealybug is right at the line between healthy and unhealthy plants. Look for bright white tiny insects that crawl around the roots, about \_\_\_\_\_ inches in the soil.
- A. 6 -12                      C. 1-2  
B. 4-6                      D. None of the above

**Hessian Fly (Mayetiola destructor)**

8. \_\_\_\_\_ will trigger fly emergence in early \_\_\_\_\_. Farmers who plant winter wheat early will have young wheat in the seedling stage when the flies emerge.
- A. Rain – June                      C. Wind – September  
B. Rain – September                      D. None of the above

**Japanese beetles (Popillia japonica)**

9. Japanese beetles feed on the leaves, flowers or fruit of more than \_\_\_\_\_ species of plants.
- A. 300                      C. 400  
B. 30                      D. None of the above

**Leaf miners**

10. There may be several generations of leafminers per year. However, the \_\_\_\_\_ generation is often the most damaging.
- A. First                      C. Third  
B. Second                      D. None of the above

**Mexican bean beetle (Epilachna Varivestis)**

11. Eggs: Eggs are approximately 1.3 mm in length and 0.6 mm in width, and are pale yellow to orange-yellow in color. They are typically found in clusters of \_\_\_\_\_ on the undersides of bean leaves.
- A. 300 -400                      C. 40 to 75  
B. 50 -100                      D. None of the above

**Pale-Striped Flea Beetle (*Systema blanda*)**

12. Flea beetles always attack True leaves while cotyledons are present and attractive.  
A. True      B. False

**Pea Aphid (*Acyrtosiphon pisum*)**

13. Prolonged periods of cool temperatures [ \_\_\_\_\_ ] and dry conditions are conducive to the development of pea aphid populations.  
A. 50°F to 60°F      C. 60°F to 70°F  
B. 40°F to 50°F      D. None of the above

**Pepper maggot (PM) (*Zonosemata electa*)**

14. Maggots reach about ½ inch in length over a period of about \_\_\_\_\_ weeks, and have no distinct head capsule. When they are ready to pupate, they exit at the blossom end, leaving tiny round exit holes. These holes allow for the entry of pathogens into the fruit.  
A. Two      C. Four  
B. Three      D. None of the above

**Seedcorn beetles (*Stenolophus lecontei*)**

15. Damage to corn seeds is more likely in cool, \_\_\_\_\_ when the seeds are slow to germinate but the insects are still actively feeding.  
A. Wet springs      C. Wet summer  
B. Dry springs      D. None of the above

**Slugs**

16. Eggs hatch the following \_\_\_\_\_.  
A. Spring and early summer      C. Summer and Fall  
B. Winter and spring      D. None of the above

**Snails**

17. Adult brown garden snails lay an average of \_\_\_\_\_ spherical, pearly white eggs at a time into a hole in the soil. They can lay eggs up to \_\_\_\_\_ times a year.  
A. 80 – 6      C. 6 – 80  
B. 10 – 12      D. None of the above

18. Slugs reach maturity after about 3 to 6 months, depending on the species, and lay translucent oval to round eggs in batches of \_\_\_\_\_ beneath leaves, in soil cracks, and in other protected areas.  
A. 30 -300      C. 3- 40  
B. 300 -500      D. None of the above

**Spider Mites**

19. Which of the following usually have a large, dark blotch on each side of the body and numerous bristles covering the legs and body?  
A. Males      C. Both sexes  
B. Females      D. None of the above
20. Immatures resemble adults (except they are much smaller), and the newly hatched larvae have only \_\_\_\_\_ legs. The other immature stages have \_\_\_\_\_ legs.  
A. 8 – 2      C. 6 -8  
B. 6 – 4      D. None of the above

### Topic 3 - Crop Chewing Insects Section – Post Quiz Part 3

#### Stem borers (Rice Destroyers)

1. Striped stemborer is one of the most important insect pests in Asia. Its damage can be as high as \_\_\_\_\_% when severe.
- A. 20                      C. 100  
B. 50                      D. None of the above

#### Squash vine borer (*Melittia satyriniformis*)

2. The squash borer is a serious pest of vine crops, commonly attacking summer squash, winter squash and pumpkins.
- A. True                      B. False

#### How to identify squash vine borers (*Melittia curcurbitae*)

3. Eggs are flat, brown, and about \_\_\_\_\_ inch long.
- A.  $\frac{1}{2}$                       C.  $\frac{1}{25}$   
B.  $\frac{3}{4}$                       D. None of the above

#### Sweet Potato Weevil (*Cylas formicarius*)

##### Life Cycle and Description

4. Adults undergo a period of diapause in the winter. Some stages can be found throughout the year if suitable host material is available.
- A. True                      B. False

#### Sweetpotato Whitefly - Silverleaf Whitefly (*Bemisia tabaci*)

5. Adults that emerge may simply fly up the same plant or over to another plant. These are called trivial flights.
- A. True                      B. False

#### Threecornered Alfalfa Hopper (*Spissistilus festinus*)

6. The threecornered alfalfa hopper adult is a \_\_\_\_\_, robust, wedge-shaped insect with clear wings. The body is about 0.25 inch (6.4 mm) long, is higher and wider at the head and tapers towards the end.
- A. Brown                      C. Bronze  
B. Green                      D. None of the above

#### Thrips

7. Thrips hatch from an egg and develop through two actively feeding larval stages and two nonfeeding stages, the \_\_\_\_\_ and pupa, before becoming an adult.
- A. Nymphs                      C. Pre-pupa  
B. Adults                      D. None of the above
8. \_\_\_\_\_ change greatly in appearance and behavior and are called pre-pupae and pupae, even though thrips do not have a True pupal stage.
- A. Nymphs                      C. Pre-pupa  
B. Late-instar larvae                      D. None of the above

**Webworms (*Hyphantria cunea*)**

9. Caterpillars grow to about 1 inch long, with black or reddish heads, pale yellow or greenish bodies marked with a broad mottled stripe containing \_\_\_\_\_ (tubercles) down the back (one pair on each body segment) and yellowish patterns on the sides. They are covered with tufts of long whitish hairs.

- A. Two rows of green bumps
- B. Two rows of red bumps
- C. Two rows of black bumps
- D. None of the above

**Bean Weevil (*Acanthoscelides obtectus*)**

10. The cowpea weevil is perhaps the least common of the weevils in California.

- A. True
- B. False

**The location of eggs varies depending on the weevil:**

11. Which of the following eggs laid loosely among beans or through cracks in the pods?

- A. Cowpea weevil
- B. Bean weevil
- C. Broad bean weevil
- D. None of the above

**Weevils (*Alfalfa and Egyptian Alfalfa*)**

12. Adult weevils of both species are dark gray and about 0.2 inch. The legless larva of the alfalfa weevil is about 0.25 inch when fully grown. It is pale green with a thin white line down the center of the back and has a brown head.

- A. True
- B. False

13. Larvae complete their growth in about \_\_\_\_\_ weeks. They will then spin a cocoon and pupate either in the leaves of the plant or on the ground.

- A. 1 to 2
- B. 3 to 4
- C. 4 to 6
- D. None of the above

14. Both weevils spend the summer as adults under the loose bark of trees, especially eucalyptus, or in any place they can wedge their bodies, such as in rough-barked trees (walnut) or under shake shingles on homes.

- A. True
- B. False

**Western Yellowstriped Armyworm (*Spodoptera Praefica*)**

15. The eggs are \_\_\_\_\_ in color and bear 45–58 small ridges.

- A. Greenish white
- B. Golden brown
- C. Greenish to pinkish brown
- D. None of the above

16. In shape, the egg is a slightly flattened sphere, measuring 0.46–0.52 mm in diameter and 0.38–0.40 mm in height.

- A. True
- B. False

17. Females typically deposit clusters of \_\_\_\_\_ eggs, usually on the underside of leaves. Total fecundity was determined to be over 3000 eggs under laboratory conditions.

- A. 100- 400
- B. 200–500
- C. 500- 1,000
- D. None of the above

18. The eggs are covered with scales from the body of the adults. Duration of the egg stage is \_\_\_\_\_ days at warm temperatures.

- A. 3 -5
- B. 5-7
- C. 7-9
- D. None of the above

### **Pupae**

19. \_\_\_\_\_ pupate in the soil within a cell containing a thin lining of silk. The reddish brown pupa measures about 18 mm in length.

- A. Nymph
- B. Adult
- C. Larvae
- D. None of the above

20. Duration of the pupal stage is \_\_\_\_\_ days, normally averaging \_\_\_\_\_ days.

- A. 9-12, 12-15
- B. 5-7, 11-15
- C. 9-22, 12-18
- D. None of the above

## **Topic 4 - Hopper's Section**

1. Locusts are actually grasshoppers that develop \_\_\_\_\_ behaviors under optimum environmental conditions which involve the presence of large populations of grasshoppers.

- A. Gregarious
- B. Aggressive
- C. Independent
- D. None of the above

2. \_\_\_\_\_ grasshoppers tend to have more brightly colored colors on their wings to entice the opposite sex.

- A. Male
- B. Both sexes
- C. Female
- D. None of the above

### **Locust Verses Grasshoppers**

3. The grasshopper belongs to the suborder known as Caelifera while the locust belongs to the suborder Acrididae. The grasshopper has \_\_\_\_\_ distinct families while the locust has only 1 family.

- A. 41
- B. 28
- C. 28
- D. None of the above

### **Grasshopper Life Cycle**

4. Extended cool temperatures (less than \_\_\_\_\_°F) and rainy weather during this period can result in severe nymphal mortality due to starvation.

- A. 65
- B. 40
- C. 75
- D. None of the above

### **Locust and Grasshopper Insecticide Control Sub-Section**

5. Grasshoppers may be controlled by applying insecticides as sprays or baits. The insecticides currently registered for use on rangeland are Dimilin, Malathion, and Carbaryl (Sevin).

- A. True
- B. False

### **Natural Control**

6. Another predator is a small red parasitic mite that can lodge itself under the grasshopper wings. These mites may stress the grasshoppers, resulting in fewer eggs or a shorter lifespan, but they are not likely to dramatically affect current populations.

- A. True      B. False

### **Locust Sub-Section**

7. The morphological structure of the locust does not differ from the grasshoppers. They are solitary animals but during \_\_\_\_\_ conditions, they form swarms. While in this form they transform their body shape, color, state of fertility, and behavior.

- A. Favorable      C. Warm  
B. Unfavorable      D. None of the above

### **Cricket Sub-Section**

8. Crickets belong to family Gryllidae, which is home to about 2,400 species of these chirpy insects. What most people do not know is that only male members of the family can produce this trademark chirping sound.

- A. True      B. False

### **House Crickets (*Acheta domesticus*)**

9. House crickets are known for their loud chirping which is caused when males rub their front wings together to attract females.

- A. True      B. False

### **House Crickets Description**

10. Nymphs are wingless but otherwise look similar to adults.

- A. True      B. False

### **Infestation**

11. The most obvious sign of a house cricket infestation is the presence of crickets in the home. They are drawn to cool, dry environments within structures.

- A. True      B. False

### **Jerusalem Cricket (*Stenopelmatus fuscus*)**

12. This slow-moving, humpbacked insect is often mistaken for a mouse.

- A. True      B. False

13. Jerusalem Crickets have enormous, round head brown and a strong jaw is able to deliver a painful bite if mishandled. Their hind legs have 2 rows of spines and seem short for a cricket. They do not have wings, and walk so slowly that most people are comfortable approaching them.

- A. True      B. False

### **Mormon Cricket (*Anabrus simplex*)**

14. While this species does eat plant matter, sometimes it resorts to cannibalism when plant foods are scarce.

- A. True      B. False

### **Distribution and Habitat**

15. The Mormon cricket, a shieldbacked katydid (family Tettigoniidae, subfamily Decticinae) and not a True cricket, lives in western North America in rangeland dominated by sagebrush and forbs.

- A. True      B. False

### **Katydid Sub-Section**

16. Katydids lay their eggs in plants whereas grasshoppers lay theirs in the ground.

- A. True      B. False

### **Katydids—*Scudderia furcata* and *Microcentum retinerve***

17. Katydids resemble crickets but have short antennae.

- A. True      B. False

### **Life cycle**

18. Katydids produce \_\_\_\_\_ generation(s) a year.

- A. 1            C. 3  
B. 40-60      D. None of the above

### **Damage**

19. Katydids may feed on leaves or fruit. Katydids do not eat the whole fruit. They often take a bite and move on, allowing the feeding site to become covered with grayish scar tissue and the expanding fruit to become misshapen. Most damage is done by nymphs.

- A. True      B. False

### **Solutions**

20. In areas where there is good biological control, parasites often attack the eggs of katydids. Control is not usually necessary, but spinosad can be applied if nymphs are numerous when fruit are small.

- A. True      B. False

## **Topic 5 – Plant Sucking Insects – Part 1**

1. Characteristics of Hemiptera include that most species are \_\_\_\_\_ but some are

- A. Terrestrial – Aquatic      C. Social – Independent  
B. Crawlers – Flyers      D. None of the above

### **Aphid (Aphidoidea) Sub-Section**

2. Aphids include \_\_\_\_\_, although individuals within a species can vary widely in color. The group includes the fluffy white woolly aphids.

- A. Two-spotted and tarnished      C. Whitefly and blackfly  
B. Greenfly and blackfly      D. None of the above

3. What substance is injected into plants by aphids may cause leaves to pucker or to become severely distorted, even if only a few aphids are present?

- A. Saliva            C. Pheromone  
B. Honeydew      D. None of the above

4. Aphids produce large amounts of a sugary liquid waste called?  
A. Saliva                      C. Pheromone  
B. Honeydew                  D. None of the above

### Summer oils

5. Fatty acid salts or insecticidal soaps are very good against aphids. As with summer oils, they apparently work to disrupt insect cell membranes. They require direct contact with the insects and leave \_\_\_\_\_ residual effect.  
A. No                      C. A good safe amount  
B. Some                  D. None of the above

### Avocado Bud Mites (*Tegolophus perseiflorae*)

6. If treating, whenever possible choose pesticides that have \_\_\_\_\_ to natural enemies.  
A. High residual toxicity or are non-toxic      C. High residual toxicity or toxic  
B. Low residual toxicity or are non-toxic      D. None of the above

### Avocado Thrips (*Scirtothrips perseae*)

7. Avocado thrips are readily distinguishable from another pest thrips in avocados, the greenhouse thrips, which are much \_\_\_\_\_ in color.  
A. Larger and black                      C. Longer and yellowish  
B. Smaller and black                      D. None of the above

### Insecticides to Avoid

8. Acephate can be \_\_\_\_\_ to natural enemies and pollinators and can cause spider mites to become abundant and damage plants after its application.  
A. Highly toxic                      C. Non-toxic  
B. Somewhat toxic                      D. None of the above

### Cicada Sub-Section

9. Cicada has \_\_\_\_\_ stages in the Life Cycle  
A. 5                      C. 3  
B. 4                      D. None of the above

### Periodical Cicadas

10. The “dog-day” or annual cicadas are \_\_\_\_\_ periodical cicadas.  
A. Considerably smaller than                      C. Same size as  
B. Considerably larger than                      D. None of the above

### Leafhoppers (*Cicadelinae*) Sub-Section

11. Leafhoppers have long, distinctive spines along their hind legs and often move sideways, like a \_\_\_\_\_ – something few insects do.

- A. Crab                      C. Ant  
B. Bird                      D. None of the above

12. Which of the following feeds primarily on plants of the rose family, although foliage of other woody plants (blackberry, Cornus, oak, Prunus, Populus, raspberry, Ulmus, Acer and others) serve as food?

- A. Potato leafhopper                      C. Aster or six-spotted leafhopper  
B. Rose leafhopper                      D. None of the above

13. Which of the following feeds on legumaceous plants like alfalfa, as well as on apple, birch, chestnut, maples, and others? Species in the genus, Erythroneura, feed on sycamore leaves, but also on apple, grape and willow.

- A. Potato leafhopper
- B. Rose leafhopper
- C. Aster or six-spotted leafhopper
- D. None of the above

14. Which of the following feeds on vegetables and annual flowers and spreads the aster yellows virus to woody plants like periwinkle and Thunbergia species?

- A. Potato leafhopper
- B. Rose leafhopper
- C. Aster or six-spotted leafhopper
- D. None of the above

### **Symptoms and Diagnosis**

15. Which of the following have a lacy pattern on their upper side, they don't jump or run sideways, and they are about half as broad as they are long? Yet another pest that can cause stippling is the spider mite. Check under leaves for the webbing left by spider mites (leafhoppers don't leave webbing).

- A. Leafhoppers
- B. Lacebugs
- C. Grasshoppers
- D. None of the above

### **Planthoppers (Issus) Sub-Section**

16. Which of the following have an enlarged pronotum (shield-like part just behind the head) that extends backward to cover the abdomen; often it is shaped to resemble a thorn or wart on a twig?

- A. Leafhoppers
- B. Treehoppers
- C. Spittlebugs and froghoppers
- D. None of the above

17. Which of the following have 1 or more rows of small spines on the hind tibiae (shin-like segments)? Their bodies tend to be parallel-sided or taper toward the rear.

- A. Leafhoppers
- B. Treehoppers
- C. Spittlebugs and froghoppers
- D. None of the above

18. Which of the following are a lot like leafhoppers but have only 1 or 2 stout spines on the hind tibiae (shin-like segments), plus a small ring of spines at the outer tip of that leg segment? Many species' bodies are widest at the hind end (a little like a resting frog, hence the name froghopper).

- A. Flatid planthoppers
- B. Treehoppers
- C. Spittlebugs and froghoppers
- D. None of the above

19. Which of the following are usually not abundant enough to cause real damage to the health of ornamental plants? Their waxy secretions and the honeydew they excrete disfigure plants and make them sticky to touch.

- A. Flatid planthoppers
- B. Treehoppers
- C. Spittlebugs and froghoppers
- D. None of the above

20. Which of the following may grow in the honeydew, further disfiguring infested plants?

- A. Fungus
- B. Scale
- C. Sooty mold
- D. None of the above

## Topic 6 – Plant Sucking Insects Section –Part 2

### Spider Mites and Predatory Mites Sub-Section

1. Which of the following and immatures are yellowish or greenish with two or more small dark blotches on their abdomen?

- A. Males      C. Both sexes
- B. Females    D. None of the above

2. Persea mite populations are suppressed, and their numbers may decline rapidly, when the daily high temperature is \_\_\_\_\_°F or more on several consecutive days and humidity is low.

- A. 90            C. 100
- B. 80            D. None of the above

### Types of Avocados Affected

3. Which of the following feeds on upper leaf surfaces that look “bronzed” by feeding damage?

- A. Six-spotted mites    C. Avocado brown mite
- B. Persea mites        D. None of the above

### Spittlebugs (Froghoppers) Sub-Section

4. Spittlebugs are the immature stage of several insect species known as froghoppers. Though many types of spittlebugs affect gardens, these froghopper nymphs all have one thing in common: the spittle-like \_\_\_\_\_ that conceals and protects them as they feed on plants.

- A. Foam        C. Spray
- B. Scale        D. None of the above

5. \_\_\_\_\_ are favorite spittlebug targets.

- A. Cole            C. Roses, strawberries and herbs
- B. Stone fruit trees    D. None of the above

### Life cycle

6. Adult spittlebugs are relatively long lived, and each can feed and move among plant parts for up to \_\_\_\_\_ months.

- A. 6            C. 3
- B. 12            D. None of the above

### Stink Bugs Sub-Section

7. Small stink bug nymphs may be mostly black are?

- A. Green stink bug    C. Southern green stink bug
- B. Brown stink bug    D. None of the above

8. Small stink bug nymphs that have reddish brown to pale green with black and white stripes on the abdomen are?

- A. Green stink bug    C. Southern green stink bug
- B. Brown stink bug    D. None of the above

9. Small stink bug nymphs that have pale yellow to tan with brown spots are?

- A. Green stink bug    C. Southern green stink bug
- B. Brown stink bug    D. None of the above

### Identifying Brown Marmorated Stink Bugs

10. Adult brown marmorated stink bug usually produces \_\_\_\_\_ generations per year in cooler climates but can lay up to \_\_\_\_\_ generations per year in warmer climates.

- A. 3-4, – 7      C. 5-6, – 12
- B. 1-2,- 5      D. None of the above

### Squash bugs (*Anasa tristis*)

11. The squash bug spends the \_\_\_\_\_ in the \_\_\_\_\_ stage.

- A. Winter – Adult      C. Summer - adult
- B. Winter – Nymph      D. None of the above

12. Female squash bugs lay small clusters of eggs (about \_\_\_\_\_) on the undersides of the leaves, especially between the veins where they form a \_\_\_\_\_.

- A. 50 – Circle      C. 20 – V
- B. 100 – L      D. None of the above

### Tarnished Plant Bugs (*Lygus lineolaris*)

13. Tarnished plant bugs nymphs develop through \_\_\_\_\_ instars before becoming adults.

- A. 3      C. 4
- B. 5      D. None of the above

### Treehoppers

14. Which of the following adults and last instars are about 2/5 inch long. Nymphs have prominent spines on the back, which is characteristic of treehopper nymphs? Host plants include ash, elm, fruit trees, hawthorn, locust, poplar, and many herbaceous plants (e.g., tomatoes and peppers).

- A. Oak treehopper      C. Threecornered alfalfa hopper
- B. Buffalo treehopper      D. None of the above

15. Which of the following adults are about 1/5 inch long and green without distinct spines on the back?

- A. Oak treehopper      C. Threecornered alfalfa hopper
- B. Buffalo treehopper      D. None of the above

### Thrips Sub-Section

16. Thrips Life Cycle: Thrips eggs hatch after \_\_\_\_\_ days, and the nymphs then feed for \_\_\_\_\_ weeks before resting to molt in \_\_\_\_\_ weeks.

- A. 1–2, 1–3, 2-4      C. 3–5, 1–3, 1–2
- B. 1–3 3-7, 3-4      D. None of the above

### Whiteflies Sub-Section

17. Which of the following adults are 0.8-1.2 millimeter long with white wings (without markings) and pale yellow bodies? The wings are held in a roof like position (about a 45-degree angle) over their bodies, whereas other whiteflies typically hold the wings nearly flat when at rest. As a result, appears more slender than other common whiteflies.

- A. Citrus blackfly      C. Banded winged Whitefly
- B. Silverleaf Whitefly      D. None of the above

18. Which of the following is an occasional pest, especially in greenhouses? Adults are about the same size as the silverleaf whitefly (0.9- 1.1 millimeter).

- A. Greenhouse Whitefly
- B. Silverleaf Whitefly
- C. Banded winged Whitefly
- D. None of the above

19. Which of the following nymphs and pupae secrete long cylindrical strands of wax extending up to two inches (50 millimeters) from the leaf surface? Accumulation of these wax strands resembles fluffy-white hair. Females deposit eggs and wax in spiral patterns that appear as white concentric circles on the undersides of host plant leaves.

- A. Citrus blackfly
- B. Giant whitefly adults
- C. Citrus whiteflies
- D. None of the above

### Biological Control

20. *Delphastus pusillus* is the most whitefly-specific predator available. It feeds primarily on whitefly eggs but may also consume nymphs. It is particularly useful in reducing whitefly populations in greenhouses, although it may also be used outside. Recommended release rates are \_\_\_\_\_ per m<sup>2</sup> (10 ft.<sup>2</sup>).

- A. 7-10
- B. 30 -40
- C. 70 -100
- D. None of the above

## Topic 7 – Stinging Insects Section

### Yellowjackets

1. Which of the following build a hard nest out of mud, usually on ceilings, walls or eaves of buildings? The nests are attended by a single female wasp.

- A. Blue Paper Wasp
- B. Mud Daubers
- C. American yellowjacket
- D. None of the above

2. Which of the following feeds abundantly on armyworms, corn earworms and other ag pests? Hornets will take house flies, blow flies and caterpillars.

- A. Mud Daubers
- B. Paper wasp
- C. German yellowjacket
- D. None of the above

### Eastern Yellowjacket (*Vespula maculifrons*)

3. The nest of *V. aculifrons* is light tan, made of partially wood and is quite strong.

- A. True
- B. False

### German Yellowjacket (*Vespula germanica*)

4. In Europe, German yellowjacket nests are \_\_\_\_\_, but in North America the vast majority of reported nests are in structures.

- A. Subterranean
- B. Rare
- C. Aerial
- D. None of the above

### Paper Wasp

5. The paper wasp populations in these nests rarely ever exceed \_\_\_\_\_.

- A. 200
- B. 1,000
- C. 500
- D. None of the above

### **Bald Faced hornet**

6. A full-sized Bald Faced hornet nest consists not of a single umbrella comb like the \_\_\_\_\_, but four to six wide circular combs -- one hanging below the other and all enclosed with an oval paper envelope consisting of several insulating layers.
- A. Mud Daubers      C. German yellowjacket  
B. Paper wasp      D. None of the above
7. Treating nests in covered or over-grown areas is best done by first broadcasting an insecticide over the area. This is especially important when the entrance hole is not visible due to loose materials. The area should be fairly well drenched both on and around the suspected entrance to the nest. Products containing Cypermethrin work well for this job.
- A. True      B. False
8. Cypermethrin is available only in liquid forms.
- A. True      B. False
9. Either formulation can be used; Demon EC, Cynoff EC are professional liquid concentrates and Demon WP, Cynoff WP are professional wettable powder concentrates.
- A. True      B. False
10. Once you have sprayed the area (or areas), make note of the wasp population over the next \_\_\_\_\_ days. A repeat application might be necessary.
- A. 7 -10      C. 10 – 14  
B. 30-45      D. None of the above

### **Other Wasps**

11. Which of the following females use vacant mud wasp nests? They hunt on the ground, preying mainly on Black Widow spiders? Adults are metallic blue, blue green or bluish black.
- A. Cricket Wasps      C. Digger Wasps  
B. Blue Mud Wasp      D. None of the above
12. Which species harvests crickets from their hiding places and buries them in a simple nest in the ground? These adults are usually slender, metallic bright blue-green or blue with dark violet-tinged wings.
- A. Cricket Wasps      C. Digger Wasps  
B. Blue Mud Wasp      D. None of the above
13. Which of the following wasps have a wide range of prey? They build simple, one cell vertical burrows and will use a rock to cover the entrance. The adults are very slender, have a long thread-waist, a black thorax marked with silver, and a gray or silvery abdomen with an orange or reddish tip.
- A. Cricket Wasps      C. Digger Wasps  
B. Blue Mud Wasp      D. None of the above
14. Which of the following is a common wasp? Females build a mud nest of cells laid side by side usually in a series of two to six, on the sides and eaves of buildings. The adults are mostly black with a yellow waist and legs.
- A. Cricket Wasps      C. Digger Wasps  
B. Mud dauber      D. None of the above

15. Which of the following can usually be found in sandy areas as their name suggests? The females build large tunnels and feed on flies. The adults are stout-bodied; gray or black with pale to bright yellow markings.
- A. Cricket Wasps      C. Digger Wasps  
B. Sand wasp      D. None of the above
16. Which of the following do not have a worker caste? All female wasps are capable of becoming the queen.
- A. Cricket Wasps      C. Umbrella wasps  
B. Blue Mud Wasp      D. None of the above
17. Which of the following are the fertile female which starts the colony and lays eggs?
- A. Queen      C. New queens  
B. Drones      D. None of the above
18. Which of the following are infertile females which do all work except laying eggs?
- A. Workers      C. New queens  
B. Drones      D. None of the above
19. Which of the following are males, which have no stingers, and are born from unfertilized eggs?
- A. Workers      C. New queens  
B. Drones      D. None of the above
20. Which of the following are fertile females, each of which, once fertilized, may start its own nest in the spring?
- A. Workers      C. New queens  
B. Drones      D. None of the above

## Topic 8 - Soil Insects Section

### Billbugs (snout beetles)

1. The hibernating adults become active in late-April to mid-May when the soil surface temperatures rise above \_\_\_\_\_°F.
- A. 70      C. 50  
B. 60      D. None of the above

### Carrot Rust Fly (*Chamaepsila rosae*)

2. Females lay up to \_\_\_\_\_ eggs on the soil surface, near the base of plants in clusters of 1 to 3 eggs.
- A. 400      C. 40  
B. 50      D. None of the above
3. When hatched, the larvae feed on the roots for a few weeks, and eventually pupate in the soil for approximately \_\_\_\_\_ days.
- A. 25      C. 60  
B. 45      D. None of the above

4. The carrot rust fly has \_\_\_\_\_ generations per year, with the second generation emerging in July.
- A. 1 to 5      C. 1 to 3  
B. 1 to 4      D. None of the above

#### **Click Beetles (Wireworms)**

5. Eggs hatch within a few weeks and larvae develop through several molts over a period of time from several months to over \_\_\_\_\_ years.
- A. 4              C. 2  
B. 3              D. None of the above

#### **Corn Rootworm (4 Primary species)**

6. Which rootworm beetle (also known as the 12-spotted cucumber beetle) has conspicuous black spots on its wing covers?
- A. Northern corn      C. Western corn  
B. Southern corn      D. None of the above

#### **Ground Beetles**

7. Ground beetles is about 1/8 - 1/4 inches long (a few can become as large as 1/2 inch in length).
- A. True              B. False

#### **Horsehair worms**

8. When horsehair or gordian worms are immature, they are parasites of insects, arthropods and other invertebrate animals.
- A. True              B. False

#### **May and June beetles (Phyllophaga spp., Polyphylla spp.)**

9. In \_\_\_\_\_ weeks, small grubs (larvae) hatch from eggs and develop through three stages (instars), with the first two stages lasting about 3 weeks.
- A. 3 to 4      C. 2 to 5  
B. 3 to 6      D. None of the above
10. Adults emerge from pupae in about \_\_\_\_\_ weeks. There is one generation per year, but in some cooler areas, development may take two years.
- A. 3              C. 5  
B. 6              D. None of the above

#### **Mole crickets**

11. The tawny mole cricket is grayish brown with four pale spots on the pronotum, while the southern mole cricket is often golden brown with a mottled brown pronotum.
- A. True              B. False

#### **Nematodes**

12. Which of the following eat a variety of organisms or may have a different diet at each life stage?
- A. Omnivores              C. Predatory nematodes  
B. Bacteria and fungi      D. None of the above

13. Root-feeders are \_\_\_\_\_, and thus are not free-living in the soil.  
A. Plant parasites                      C. Predatory nematodes  
B. Bacteria and fungi                  D. None of the above

#### **Scarab beetles**

14. Scarab beetles' larvae of most scarab beetles are brownish, S-shaped grubs that live underground or in other protected places.  
A. True                  B. False

#### **Southwestern masked chafer (*Cyclocephala hirta*)**

15. The second instars are reached in \_\_\_\_\_ days at \_\_\_\_\_°F and third instars are common by September.  
A. 20 to 24, 78                  C. 15-20, 75  
B. 20 to 24, 80                  D. None of the above

#### **Sowbugs aka Pillbugs**

16. Sowbugs also have two tail-like appendages which project out from the rear end of the body.  
A. True                  B. False

#### **Springtails - Collembola**

17. Juvenile Collembola grow and undergo \_\_\_\_\_ molts before they become sexually mature.  
A. 1-4                  C. 2-5  
B. 3-12                  D. None of the above

18. Many springtails are opportunistic species capable of rapid population growth. Under favorable conditions they can reach densities of more than \_\_\_\_\_ individuals per square \_\_\_\_\_.  
A. 500- yard                  C. 100 – Centimeter  
B. 1,000 – inch                  D. None of the above

#### **Wood Cockroaches**

19. The wings of the wood roach females extend slightly beyond the tip of the abdomen. The males' wings cover only half of the abdomen, and nymphs are winged.  
A. True                  B. False
20. Wood roach males are poor fliers. Sometimes females fly into buildings.  
A. True                  B. False

## **Topic 9 - Worker Protection Standard Introduction Section**

#### **Employers covered by the WPS must:**

1. Mitigate exposures by requiring decontamination supplies be present and emergency assistance be available.  
A. True                  B. False

2. Inform workers about pesticide hazards by requiring safety training (\_\_\_\_\_), safety posters, access to labeling information, and access to specific information (listing of treated areas on the establishment).
- A. Owners & Handlers                      C. Handlers & Applicators  
B. Handlers & Workers                      D. None of the above

### **WPS Requirements 2015-2018**

3. First-time ever minimum age requirement: Children under \_\_\_\_\_ are prohibited from handling pesticides.
- A. 16                      C. 21  
B. 18                      D. None of the above

### **Central Location**

4. You will still need to keep pesticide application information for \_\_\_\_\_ days at the central location and the pesticide safety information (poster).
- A. 30                      C. 15  
B. 60                      D. None of the above

### **Protection Against Retaliatory Acts**

5. Requirements of this subpart designed to reduce the risks of illness or injury resulting from workers' occupational exposure to pesticides, including application and entry restrictions, the design of the warning sign, posting of warning signs, oral warnings, the availability of specific information about applications, and the protection against retaliatory acts.
- A. True                      B. False

### **Four Basic WPS Requirements Subsection**

#### **These regulations contained four basic requirements:**

6. Protective clothing is not required for any worker entering a treated area before the specific re-entry period has expired.
- A. True                      B. False

### **General Duties of WPS**

7. The general duties of the WPS require an agricultural employer or a pesticide handler-employer to: Assure that each worker and handler subject to the standard receives the \_\_\_\_\_.
- A. Provisions of this standard                      C. Labeling of the pesticide  
B. Required protections                      D. None of the above

### **Who is Covered by the 2015 WPS?**

8. Which of the following are those who perform tasks related to growing and harvesting plants on farms or in greenhouses, nurseries, or forests?
- A. Agricultural workers                      C. Pesticide handlers  
B. Handlers- Workers                      D. None of the above

### **Pesticide Handlers**

9. A pesticide handler is anyone who: (1) is employed (including self-employed) for any type of compensation by an agricultural establishment or a commercial pesticide handling establishment that uses pesticides in the production of agricultural plants on a farm, forest, nursery, or greenhouse, and (2) is cleaning, handling, adjusting, or repairing the parts of mixing, loading, or application equipment that may contain pesticide residues.
- A. True                      B. False

10. A person is a handler if he or she only handles pesticide containers that have been emptied or cleaned according to instructions on pesticide product labeling or, if the labeling has no such instructions, have been triple-rinsed or cleaned by an equivalent method, such as pressure rinsing.

- A. True                      B. False

## Topic 10- PPE, Safety and Health Section

### Personal Protective Equipment (PPE)

1. When the PPE requirement falls under the WPS, the employer has the following responsibilities:

Provide soap, single-use towels, and water to each \_\_\_\_\_ at the end of any handling activity when PPE is removed.

- A. Person                      C. Worker  
B. Handler                     D. None of the above

2. When the PPE requirement falls under the WPS, the employer has the following responsibilities:

Prevent any \_\_\_\_\_ from wearing or taking home contaminated PPE, unless proper instructions have been given regarding the washing and care of PPE.

- A. Person                      C. Worker  
B. Handler                     D. None of the above

### §170.240 Personal Protective Equipment

3. Requirement. Any \_\_\_\_\_ who performs tasks as a pesticide handler shall use the clothing and personal protective equipment specified on the labeling for use of the product.

- A. Handler                     C. Worker  
B. Person                      D. None of the above

### Definition.

4. Long-sleeved shirts, short-sleeved shirts, long pants, short pants, shoes, socks, and other items of work clothing are considered personal protective equipment.

- A. True                         B. False

### §170.507 Personal Protective Equipment Rule

5. Handler responsibilities. Any person who performs handler activities involving a pesticide product must use the clothing and personal protective equipment specified on the pesticide product labeling for use of the product, except as provided in §170.607 of this part.

- A. True                         B. False

6. If used, separable glove liners must be discarded immediately after a total of no more than \_\_\_\_\_ hours of use or within \_\_\_\_\_ hours of when first put on, whichever comes first.

- A. 15 – 48                      C. 10 -24  
B. 8 – 48                        D. None of the above

**§170.505 Requirements during Applications to Protect Handlers, Workers, and other Persons**

7. Handlers using highly toxic pesticides. The handler employer must ensure that any handler who is performing any handler activity with a pesticide product that has the skull-and-crossbones symbol on the front panel of the pesticide product label is monitored visually or by voice communication at least every \_\_\_\_\_ hours.

- A. 2
- B. 4
- C. 24
- D. None of the above

**Prevention, Recognition, First Aid Treatment of Heat-Related Illness**

8. Which of the following are caused by the loss of body salts and fluid during sweating? Low salt levels in muscles cause painful cramps.

- A. Heat cramps
- B. Heat rash
- C. Tired muscles
- D. None of the above

9. Which of the following is those used for performing the work—are usually the ones most affected by cramps. Cramps may occur during or after working hours?

- A. Heat cramps
- B. Heat rash
- C. Tired muscles
- D. None of the above

10. Which of the following is the most common problem in hot work environments?

- A. Heat cramps
- B. Heat rash
- C. Tired muscles
- D. None of the above

**Topic 11 - WPS Required Training Section**

**§170.401 Training Requirements for Workers**

1. Routine and emergency decontamination procedures, including emergency eye flushing techniques, and if pesticides are spilled or sprayed on the body to use decontamination supplies to wash immediately or rinse off in the nearest clean water, including springs, streams, lakes or other sources if more readily available than decontamination supplies, and as soon as possible, wash or shower with soap and water, shampoo hair, and change into clean clothes.

- A. True
- B. False

**§170.405 Entry Restrictions Associated with Pesticide Applications**

2. The application exclusion zone is the area that extends \_\_\_\_\_ feet horizontally from the application equipment in all directions during application when the pesticide is applied.

- A. 100
- B. 50
- C. 500
- D. None of the above

3. The application exclusion zone is the area that extends \_\_\_\_\_ feet horizontally from the application equipment in all directions during application when the pesticide is applied not as in §170.405(a)(1)(i)(A)-(D) and is sprayed from a height of greater than \_\_\_\_\_ inches from the planting medium using a spray quality (droplet spectrum) of medium or larger (volume median diameter of 294 microns or greater).

- A. 50 – 6
- B. 25 – 12
- C. 25 – 6
- D. None of the above

### Worker Training 2018

4. Workers must be \_\_\_\_\_ years old to perform early-entry activities.  
A. 16                      C. 21  
B. 18                      D. None of the above

### Pesticide Safety, Application and Hazard Information

5. The EPA WPS safety poster (or equivalent) where decontamination supplies are located at permanent sites and where decontamination supplies are provided for \_\_\_\_\_ or more workers. 170.311 (a)(5)

- A. 11                      C. 15  
B. 25                      D. None of the above

6. Display the EPA WPS safety poster or equivalent information before an application takes place and for \_\_\_\_\_ days after the REI expires. 170.309 (h)

- A. 10                      C. 30  
B. 15                      D. None of the above

7. Display the SDS and application information within \_\_\_\_\_ hours of the application and before workers enter treated areas. This information must be displayed for \_\_\_\_\_ days after the REI expires and kept in records on the agricultural establishment until \_\_\_\_\_ years after the REI expires. 170.309 (h)&(l) and 170.311 (b)(5)-(6)

- A. 24 – 10 -5                      C. 24 – 30 - 2  
B. 12- 30- 3                      D. None of the above

8. Provide the SDS and application information upon request of a worker, handler, designated representative or medical personnel, within \_\_\_\_\_ days. 170.311 (b)(7)-(9)

- A. 10                      C. 30  
B. 15                      D. None of the above

### Decontamination Supplies

9. Establish accessible decontamination supplies located together within \_\_\_\_\_ mile of all **workers** (when required 170.411 (c)) and **handlers**. 170.411 and 170.509

- A.  $\frac{1}{4}$                       C.  $\frac{1}{2}$   
B. 1                      D. None of the above

10. \_\_\_\_\_ gallon(s) of water per worker and \_\_\_\_\_ gallon(s) of water per handler at the beginning of each work period for routine and emergency decontamination,

- A. 3 – 1                      C. 1 – 5  
B. 1 – 3                      D. None of the above

11. When a product requires protective eyewear for **handlers**, and/or when using a closed system under pressure, provide the following in mixing and loading areas: a system that can deliver gently running water at \_\_\_\_\_ gallons per minute for at least \_\_\_\_\_ minutes or \_\_\_\_\_ gallons of water in containers suitable for providing a gentle eye-flush for about 15 minutes. 170.509 (d)(1)

- A. 10 – 15 – 6                      C. 0.4 – 15 – 6  
B. 0.4 – 5 – 1                      D. None of the above

12. When applying a product that requires protective eyewear, provide \_\_\_\_\_ pint(s) of water per **handler** in portable containers that are immediately available to each handler. 170.509 (d)(2)

- A. 3
- B. 1
- C. 5
- D. None of the above

### Employer Information Exchange

13. Owners/operators of agricultural establishments must make sure any commercial pesticide handler employer they hire is aware of: Specific location and description of any treated areas where an REI is in effect that the commercial handler may be in or walk within \_\_\_\_\_ mile.

- A.  $\frac{1}{4}$
- B. 1
- C.  $\frac{1}{2}$
- D. None of the above

### Notice About Applications 170.409 (a)

14. If not, post warning signs if the REI is **greater than**: \_\_\_\_\_ hours for outdoor production or \_\_\_\_\_ hours for enclosed space production.

- A. 72 -10
- B. 24 -8
- C. 48 -4
- D. None of the above

### Application Restrictions and Monitoring 170.505

15. When anyone is handling a highly toxic pesticide with a skull and crossbones, maintain sight or voice contact every \_\_\_\_\_ hours.

- A. 2
- B. 4
- C. 1
- D. None of the above

### Safe Operation of Equipment

16. A handler employer must assure that handlers are instructed in the safe operation of all equipment they will be using. It is the handler-employer's responsibility to assure that the equipment is working properly and to inform employees, when appropriate, that the equipment may be contaminated with pesticides and to explain the \_\_\_\_\_.

- A. Handling activity
- B. Product use
- C. Correct way to handle such equipment
- D. None of the above

### Personal Protective Equipment

17. Any person handling a pesticide must use the clothing and PPE specified on the label for \_\_\_\_\_.

- A. Handling activity
- B. Product use
- C. Type of PPE
- D. None of the above

### Emergency Assistance

18. A handler employer must provide the same emergency assistance to \_\_\_\_\_ as discussed for workers.

- A. Handlers
- B. Applicators
- C. Owners
- D. None of the above

**§170.309 Agricultural Employer Duties 2015-2018 Rule**

19. Agricultural employers must: Provide emergency assistance in accordance with this paragraph. If there is reason to believe that a worker or handler has experienced a potential pesticide exposure during his or her employment on the agricultural establishment or shows symptoms similar to those associated with acute exposure to pesticides during or within \_\_\_\_\_ hours after his or her employment on the agricultural establishment, and needs emergency medical treatment, the agricultural employer must do all of the following promptly after learning of the possible poisoning or injury:

- A. 10
- B. 72
- C. 24
- D. None of the above

20. Agricultural employers must: Display, maintain, and provide access to pesticide safety information and pesticide application and hazard information in accordance with §170.311 if workers or handlers are on the establishment and within the last \_\_\_\_\_ days a pesticide product has been used or a restricted-entry interval for such pesticide has been in effect on the establishment.

- A. 10
- B. 15
- C. 30
- D. None of the above

**California DPR Requirement**

The Assignment must be submitted to TLC by December 27 in order to be submitted to DPR by the 30th. If it is late, you will be penalized \$50 per day.



## Agricultural Applicator Assignment #3 - N-S Last Names

You will have 90 days from the start of this course to have successfully passed this assignment with a score of 80%. You may e mail the answers to TLC, info@tlch2o.com or fax the answers to TLC, (928) 272-0747. This assignment is available to you in a Word Format on TLC's Website. You can find online assistance for this course on the in the Search function on Adobe Acrobat PDF to help find the answers. Once you have paid the course fee, you will be provided complete course support from Student Services (928) 468-0665.

**Write your answers on the Answer Key found in the front of this assignment.**

We will require all students to fax or e-mail a copy of their driver's license with the registration form.

Multiple Choice, Please select one answer and mark it on the answer key. The answer must come from the course text. (s) Means answer can be plural or singular.

Please write down any problem you may have with a question.

### Topic 1 - Crop Chewing Insects Section – Part 1

#### Alfalfa Caterpillar (*Colias eurytheme*)

1. The adults of the alfalfa caterpillar are the familiar yellow butterflies that can be seen flying over alfalfa, soybean, and other flowering fields, particularly in \_\_\_\_\_. The undersides of the wings are solid yellow; the topside of the wings are bordered in \_\_\_\_\_.

- A. August - black
- B. July - Red
- C. May - Yellow
- D. None of the above

#### Beet Armyworm (*Spodoptera exigua*)

2. Each moth can lay up to \_\_\_\_\_ eggs during their week-long life although some may live up to \_\_\_\_\_ days.

- A. 600 – 30
- B. 500 – 60
- C. 1,000 – 45
- D. None of the above

3. Females begin laying \_\_\_\_\_ days after mating, and they prefer young rather than old plants. Flight activity is greatest in July and August.

- A. 2
- B. 4
- C. 10
- D. None of the above

#### Blister Beetles (Insecta: Coleoptera: Meloidae)

4. A few species have rounded "ball-like" abdomen or short wings and a larva-form abdomen. All blister beetles, however, have the distinctive narrow " \_\_\_\_\_ " which contrasts with the broader head and abdomen.

- A. Head
- B. Neck
- C. Abdomen
- D. None of the above

5. Cantharidin is produced only by \_\_\_\_\_ blister beetles and is stored until mating. Thus, mating status determines whether \_\_\_\_\_ contain the toxin.

- A. Male – Male
- B. Female - Male
- C. Males – Females
- D. None of the above

**Boil Weevil (*Anthonomus grandis*)**

6. The larva feeds for \_\_\_\_\_ days before pupating inside the square or small boll. During the next \_\_\_\_\_ days the pupal stage changes into an adult.
- A. 5 -10, 7 -10                      C. 10- 14, 4 to 6  
B. 7 to 14, 4 to 6                      D. None of the above

**Cabbage Looper (*Trichoplusia ni*)**

7. The mature larva is predominantly \_\_\_\_\_, but is usually marked with a distinct \_\_\_\_\_ stripe on each side.
- A. Green –yellow                      C. Green – white  
B. White – green                      D. None of the above

**Celery Leaf-tier (*Udea rubigalis*)**

8. At five different locations in planting inspect 20 plants for larvae on a weekly basis. If more than 4 weeks before harvest and there are \_\_\_\_\_ or more larvae per \_\_\_\_\_ plants, treatment is warranted.
- A. 2 -100                                  C. 6 -20  
B. 100 -20                                  D. None of the above

**Clover Root Curculio (*Sitona hispidulus* F.)**

9. The clover root curculio life cycle is similar to alfalfa weevil in that the adults leave the alfalfa fields and spend the \_\_\_\_\_ in protected areas.
- A. Winter                      C. Spring  
B. Summer                      D. None of the above

10. Larvae are legless with a white body and brown head. They are stout and curved, reaching to be \_\_\_\_\_ mm in length when fully mature. Pupae are \_\_\_\_\_ mm and pale yellow in color.
- A. 6 to 7, 8                                  C. 6 to 7, 4  
B. 4, 6 to 7                                  D. None of the above

**Cotton Bollworm (*Helicoverpa armigera*)**

11. The full-grown larva is about 1½ inches long with a light-colored head capsule. The predominant body color may range from \_\_\_\_\_ to various shades of tan or dark brown.
- A. Pink or green                                  C. Pink to white  
B. Purple or orange                                  D. None of the above

**Cucumber Beetle**

12. Adult striped cucumber beetle has a \_\_\_\_\_ head and antennae.
- A. Red                      C. Yellow  
B. Black                      D. None of the above
13. Adult striped cucumber beetle has an \_\_\_\_\_ prothorax (the first area behind the head).
- A. Yellowish                      C. Orangish  
B. Reddish                      D. None of the above

### **Cutworms**

14. The larvae are dingy, grayish-black and smooth-skinned and may reach \_\_\_\_\_ inches in length.

- A. 3
- B. 1
- C. 2
- D. None of the above

### **Earwig (*Forficula auricularia*)**

15. Young earwigs develop gradually, passing through \_\_\_\_\_ nymphal instars before becoming adults. They are similar in appearance to adults, but lack wings and the large sized pincers. Most species in this country have one generation per year.

- A. 4-5
- B. 1-3
- C. 3-5
- D. None of the above

### **Tomato & Tobacco Hornworm**

16. The tomato hornworm is green with eight, white “\_\_\_\_\_” markings along its back, pointing toward the head. At the end of its abdomen is a notable black tail spine.

- A. V
- B. C
- C. Straight line
- D. None of the above

### **European Corn Borer (*Ostrinia nubilalis*)**

17. Eggs are deposited in irregular clusters of about \_\_\_\_\_. The eggs are oval, flattened, and creamy white in color, usually with an iridescent appearance. The eggs darken to a beige or orangish tan color with age.

- A. 15 to 20
- B. 50 -100
- C. 20-50
- D. None of the above

18. Male moths are pale yellow to light brown in color, with both the forewing and hind wing crossed by dark zigzag lines and bearing pale, often yellowish, patches.

- A. True
- B. False

19. The female is darker in color, usually pale brown or grayish brown, but also with dark zigzag lines and yellowish patches.

- A. True
- B. False

20. Moths are most active during the first three to five hours of darkness.

- A. True
- B. False

## **Topic 2 - Crop Chewing Insects Section – Post Quiz Part 2**

### **Flea Weevil**

1. European elm flea weevils live through the \_\_\_\_\_ as adults and in the spring, move to the elm tree. Soon after, the adults lay eggs along the edges of the veins.

- A. Spring
- B. Winter
- C. Summer
- D. None of the above

2. Adults emerge later in the \_\_\_\_\_ and feed until fall.

- A. Spring
- B. Winter
- C. Summer
- D. None of the above

**Four-lined Plant Bug (Poecalocapsus linectus)**

3. Nymphs feed for about \_\_\_\_\_ days and do most of the damage because they are relatively immobile compared to adults.
- A. 60                      C. 45  
B. 30                      D. None of the above

**Fruit fly / Drosophila Flies**

4. The adult male spotted wing drosophila has a dark spot on the front edge near the tip of each forewing; the adult female looks the same as other Drosophila sp. commonly found in vineyards except that it has a large and serrated ovipositor.
- A. True                    B. False

**Fungus gnats (Orfelia and Bradysia species)**

5. The adults are tiny, flying insects about 1/16 to 1/8 inch long. They look a little like small mosquitoes with gray bodies and long, slender legs. The wings are usually clear. The insects have \_\_\_\_\_ that are larger than their \_\_\_\_\_.
- A. Head - segmented antennae                      C. Segmented antennae - Body  
B. Segmented antennae – Head                      D. None of the above

**Ground Mealybug (Rhizoecus kondonis)**

6. The ground mealybug feeds on alfalfa roots and can cause severe yield losses.
- A. True                    B. False

**Hessian Fly (Mayetiola destructor)**

7. The larvae feed for about \_\_\_\_\_ weeks. They then form the puparium that resembles a "flaxseed".
- A. 1 -2                      C. 2-3  
B. 3-4                      D. None of the above

**Japanese beetles (Popillia japonica)**

8. \_\_\_\_\_-shaped, white to cream-colored grubs with a distinct tan-colored head.
- A. V                      C. Y  
B. C                      D. None of the above

**Leaf miners**

9. Once the larvae have completed development, they may remain in the plant or drop to the ground to pupate.
- A. True                    B. False

**Mexican bean beetle (Epilachna Varivestis)**

10. Eggs are approximately 1.3 mm in length and 0.6 mm in width, and are pale yellow to orange-yellow in color. They are typically found in clusters of \_\_\_\_\_ on the undersides of bean leaves.
- A. 300 -400                      C. 40 to 75  
B. 50 -100                      D. None of the above

**Pale-Striped Flea Beetle (*Systema blanda*)**

11. The pale-striped flea beetle, *Systema blanda*, is a small, 3/16-inch beetle that invades peppers early in the season.  
A. True      B. False

**Pea Aphid (*Acyrtosiphon pisum*)**

12. Prolonged periods of cool temperatures [ \_\_\_\_\_ ] and dry conditions are conducive to the development of pea aphid populations.  
A. 50°F to 60°F      C. 60°F to 70°F  
B. 40°F to 50°F      D. None of the above

**Pepper maggot (PM) (*Zonosemata electa*)**

13. Maggots reach about ½ inch in length over a period of about \_\_\_\_\_ weeks, and have no distinct head capsule. When they are ready to pupate, they exit at the blossom end, leaving tiny round exit holes. These holes allow for the entry of pathogens into the fruit.  
A. Two      C. Four  
B. Three      D. None of the above

**Seedcorn beetles (*Stenolophus lecontei*)**

14. Damage to corn seeds is more likely in cool, \_\_\_\_\_ when the seeds are slow to germinate but the insects are still actively feeding.  
A. Wet springs      C. Wet summer  
B. Dry springs      D. None of the above

**Slugs**

15. Slugs are generally active at night when it is cool and damp, although they may be seen during the day in cool, shaded sites. Warm, dry conditions are less favorable to them.  
A. True      B. False

**Snails**

16. It takes about \_\_\_\_\_ for snails to mature.  
A. 2 years      C. 2 months  
B. 3 months      D. None of the above

**Common Snail Species**

17. There are more than \_\_\_\_\_ species of apple snail that exists. Two species, *Pomacea canaliculata* and *Pomacea maculata*, commonly known as Golden Apple Snails, are highly invasive and cause damage to rice crops.  
A. 50      C. 75  
B. 100      D. None of the above

**Spider Mites**

18. Adult mites have \_\_\_\_\_ legs and an oval body with \_\_\_\_\_ red eyespots near the head end.  
A. 8 – 2      C. 6 -2  
B. 8 – 4      D. None of the above
19. Which of the following usually have a large, dark blotch on each side of the body and numerous bristles covering the legs and body?  
A. Males      C. Both sexes  
B. Females      D. None of the above

20. Immatures resemble adults (except they are much smaller), and the newly hatched larvae have only \_\_\_\_\_ legs. The other immature stages have \_\_\_\_\_ legs.
- A. 8 – 2      C. 6 -8  
B. 6 – 4      D. None of the above

### Topic 3 - Crop Chewing Insects Section – Post Quiz Part 3

#### Stem borers (Rice Destroyers)

1. Gold-fringed stemborer can cause yield loss of about \_\_\_\_\_%.
- A. 20      C. 30  
B. 50      D. None of the above

#### Squash vine borer (*Melittia satyriniformis*)

2. The squash borer usually occurs in high numbers although their presence is usually not noticed until after damage is done.
- A. True      B. False

#### Sweet Potato Weevil (*Cylas formicarius*)

3. Temperature is the principal factor affecting larval development rate, with larval development (not including the pre-pupal period) occurring in about \_\_\_\_\_ days at 30° and 24° C, respectively. The larva creates winding tunnels packed with fecal material as it feeds and grows.
- A. 10 and 35      C. 7 to 10  
B. 35 to 40      D. None of the above

#### Sweetpotato Whitefly - Silverleaf Whitefly (*Bemisia tabaci*)

4. Migrating individuals usually develop on plants that are senescing. These migrations can often be massive and can lead to severe infestation of newly planted crops.
- A. True      B. False

#### Threecornered Alfalfa Hopper (*Spissistilus festinus*)

5. \_\_\_\_\_ are mobile whereas \_\_\_\_\_ cannot fly and are confined to the lower portions of the plant.
- A. Nymphs - Pre-pupa      C. Adults - Pre-pupa  
B. Adults - nymphs      D. None of the above

#### Thrips

6. Immatures (called larvae or nymphs) are oblong or slender and elongate and lack wings.
- A. Nymphs      C. Larvae or nymphs  
B. Adults      D. None of the above
7. Thrips hatch from an egg and develop through two actively feeding larval stages and two nonfeeding stages, the \_\_\_\_\_ and pupa, before becoming an adult.
- A. Nymphs      C. Pre-pupa  
B. Adults      D. None of the above
8. \_\_\_\_\_ change greatly in appearance and behavior and are called pre-pupae and pupae, even though thrips do not have a True pupal stage.
- A. Nymphs      C. Pre-pupa  
B. Late-instar larvae      D. None of the above

9. Thrips have several generations (up to about \_\_\_\_\_) a year. When the weather is warm, the life cycle from egg to adult may be completed in as short a time as \_\_\_\_\_ weeks.

- A. 4-3            C. 10 – 2
- B. 8 – 2        D. None of the above

### **Webworms (*Hyphantria cunea*)**

#### **Description**

10. Caterpillars grow to about 1 inch long, with black or reddish heads, pale yellow or greenish bodies marked with a broad mottled stripe containing \_\_\_\_\_ (tubercles) down the back (one pair on each body segment) and yellowish patterns on the sides. They are covered with tufts of long whitish hairs.

- A. Two rows of green bumps            C. Two rows of black bumps
- B. Two rows of red bumps            D. None of the above

11. \_\_\_\_\_ moths are mostly white with dark spots on the wings.

- A. Nymph        C. Pre-pupa
- B. Adult        D. None of the above

### **Bean Weevil (*Acanthoscelides obtectus*)**

12. Which of the following eggs glued to the bean or the pod?

- A. Cowpea weevil        C. Broad bean weevil
- B. Bean weevil        D. None of the above

13. Which of the following eggs glued to green pods?

- A. Cowpea weevil        C. Broad bean weevil
- B. Bean weevil        D. None of the above

14. Which of the following eggs laid loosely among beans or through cracks in the pods?

- A. Cowpea weevil        C. Broad bean weevil
- B. Bean weevil        D. None of the above

### **Weevils (*Alfalfa and Egyptian Alfalfa*)**

15. Larvae complete their growth in about \_\_\_\_\_ weeks. They will then spin a cocoon and pupate either in the leaves of the plant or on the ground.

- A. 1 to 2        C. 4 to 6
- B. 3 to 4        D. None of the above

16. Both weevils spend the summer as adults under the loose bark of trees, especially eucalyptus, or in any place they can wedge their bodies, such as in rough-barked trees (walnut) or under shake shingles on homes.

- A. True        B. False

### **Western Yellowstriped Armyworm (*Spodoptera Praefica*)**

#### **Eggs**

17. The eggs are \_\_\_\_\_ in color and bear 45–58 small ridges.

- A. Greenish white        C. Greenish to pinkish brown
- B. Golden brown        D. None of the above

18. In shape, the egg is a slightly flattened sphere, measuring 0.46–0.52 mm in diameter and 0.38–0.40 mm in height.

- A. True      B. False

19. Females typically deposit clusters of \_\_\_\_\_ eggs, usually on the underside of leaves. Total fecundity was determined to be over 3000 eggs under laboratory conditions.

- A. 100- 400    C. 500- 1,000  
B. 200–500    D. None of the above

20. The eggs are covered with scales from the body of the adults. Duration of the egg stage is \_\_\_\_\_ days at warm temperatures.

- A. 3 -5      C. 7-9  
B. 5-7      D. None of the above

### Topic 4 - Hopper's Section

1. \_\_\_\_\_ grasshoppers mostly hop and they have small and weak wings hence they cannot fly for long distances.

- A. Male      C. Female  
B. Both sexes      D. None of the above

#### Locust Verses Grasshoppers

2. The grasshopper belongs to the suborder known as Caelifera while the locust belongs to the suborder Acrididae. The grasshopper has \_\_\_\_\_ distinct families while the locust has only 1 family.

- A. 41      C. 28  
B. 28      D. None of the above

3. Both adults of the locusts and grasshoppers have two wings in the front and two membranous wings in the back which are all fully developed.

- A. True      B. False

#### Grasshopper Life Cycle

4. Typically, a female grasshopper will lay about \_\_\_\_\_ eggs during the summer and fall.

- A. 700      C. 100  
B. 40-70      D. None of the above

5. Grasshopper nymphs go through \_\_\_\_\_ stages or instars.

- A. 3      C. 5  
B. 4      D. None of the above

6. Adult grasshoppers, the only stage with wings, can readily move out of hatching areas. Hoppers begin egg laying one to three weeks after reaching the adult stage and may live two to three months, depending on the late summer and early fall weather. All developmental stages are influenced by\_\_\_\_\_.

- A. Weather      C. Moisture  
B. Food source      D. None of the above

### **Predator Avoidance**

7. Grasshoppers employ a wide range of mechanisms to keep from being eaten. The foremost of these is \_\_\_\_\_, matching the background in color or texture.

- A. Cryoiosist
- B. Crypsis
- C. Caryopsis
- D. None of the above

### **Locust Sub-Section**

8. The transition from the solitary phase in locusts is triggered by the secretion of the hormone \_\_\_\_\_ which has been linked to boosting moods in humans.

- A. Malathion
- B. Estrone
- C. Serotonin
- D. None of the above

9. The morphological structure of the locust does not differ from the grasshoppers. They are solitary animals but during \_\_\_\_\_ conditions, they form swarms. While in this form they transform their body shape, color, state of fertility, and behavior.

- A. Favorable
- B. Unfavorable
- C. Warm
- D. None of the above

### **Migratory Phase**

10. During the migratory phase, locusts can fly for long distances as they have long and strong wings that can enable them to fly for long distances. They only feed on crops and vegetation for survival. In case there is an absence of vegetation where they are, then they will be forced to migrate.

- A. True
- B. False

### **Locusts in the USA- Current Information**

11. There are currently no native species of **swarming** locusts in the US. Locusts are a collection of certain species of short-horned grasshoppers in the family Acrididae that have a swarming phase.

- A. True
- B. False

### **Cricket Sub-Section**

12. Crickets belong to family Gryllidae, which is home to about 2,400 species of these chirpy insects. What most people do not know is that only male members of the family can produce this trademark chirping sound.

- A. True
- B. False

### **House Crickets (*Acheta domesticus*)**

13. House crickets are known for their loud chirping which is caused when males rub their front wings together to attract females.

- A. True
- B. False

### **House Crickets Description**

14. Nymphs are wingless but otherwise look similar to adults.

- A. True
- B. False

### **Infestation**

15. The most obvious sign of a house cricket infestation is the presence of crickets in the home. They are drawn to warm, moist environments within structures.

- A. True
- B. False

**Jerusalem Cricket (Stenopelmatus fuscus)**

16. This fast-moving, humpbacked insect is often mistaken for a mouse.  
A. True      B. False
17. Jerusalem Crickets have small, round head brown and a weak jaw.  
A. True      B. False

**Distribution and Habitat**

18. The Mormon cricket, a shieldbacked katydid and is a True cricket, lives in northern North America in rangeland dominated by sagebrush and forbs.  
A. True      B. False

**Katydid Sub-Section**

19. Katydid lay their eggs in the ground.  
A. True      B. False
20. Katydid produce \_\_\_\_\_ generation(s) a year.  
A. 1            C. 3  
B. 40-60      D. None of the above

**Topic 5 – Plant Sucking Insects – Part 1**

1. Characteristics of Hemiptera include: Antennae are fairly long and contain \_\_\_\_\_ segments  
A. 2 -3            C. 4-5  
B. 6-8            D. None of the above

**Aphid (Aphidoidea) Sub-Section**

2. What substance is injected into plants by aphids may cause leaves to pucker or to become severely distorted, even if only a few aphids are present?  
A. Saliva            C. Pheromone  
B. Honeydew        D. None of the above
3. A fungus called sooty mold can grow on honeydew deposits that accumulate on leaves and branches, turning them black. The appearance of \_\_\_\_\_ on plants may be the first time that an aphid infestation is noticed.  
A. Sooty mold        C. Pheromone  
B. Honeydew        D. None of the above
4. All aphids have \_\_\_\_\_, but some are smaller and less obvious.  
A. Proboscis        C. Cornicles  
B. Spinnerets        D. None of the above

**Nervous System Insecticides**

5. What chemical product is not effective against many aphids so it is generally not a good choice for control unless recommended specifically?  
A. Malathion,        C. Dursban (chlorpyrifos),  
B. Sevin (carbaryl)    D. None of the above

### Avocado Bud Mites (*Tegolophus perseiflorae*)

6. A few miticides are registered for use on avocados when fruit is present. \_\_\_\_\_ sprays are recommended.

- A. Sulfur or oil emulsion
- B. Sevin (carbaryl)
- C. Dursban (chlorpyrifos)
- D. None of the above

### Management

7. If treating, whenever possible choose pesticides that have \_\_\_\_\_ to natural enemies.

- A. High residual toxicity or are non-toxic
- B. Low residual toxicity or are non-toxic
- C. High residual toxicity or toxic
- D. None of the above

### Avocado Thrips (*Scirtothrips perseae*)

8. Adult avocado thrips are \_\_\_\_\_ in color, the abdomens may appear \_\_\_\_\_ because of the chlorophyll extracted from plant material during feeding.

- A. Straw yellow - greenish
- B. Bordello blue - purplish
- C. Grayish black - white
- D. None of the above

### Insecticides to Avoid

9. Acephate can be \_\_\_\_\_ to natural enemies and pollinators and can cause spider mites to become abundant and damage plants after its application.

- A. Highly toxic
- B. Somewhat toxic
- C. Non-toxic
- D. None of the above

### Cicada Sub-Section

10. These invertebrates that have captured the fascination of many cultures for thousands of years are incredibly unique creatures. There are more than \_\_\_\_\_ cicada species, all of which can be separated into \_\_\_\_\_ categories.

- A. 1,000 - 3
- B. 3,000 - 2
- C. 300 - 4
- D. None of the above

11. Periodical cicadas are found only in eastern North America. There are seven species — four with \_\_\_\_\_-year life cycles and three with \_\_\_\_\_-year cycles.

- A. 7- 11
- B. 13 -17
- C. 13 - 21
- D. None of the above

### Leafhoppers (*Cicadelinae*) Sub-Section

12. Which of the following feeds primarily on plants of the rose family, although foliage of other woody plants (blackberry, Cornus, oak, Prunus, Populus, raspberry, Ulmus, Acer and others) serve as food?

- A. Potato leafhopper
- B. Rose leafhopper
- C. Aster or six-spotted leafhopper
- D. None of the above

13. Which of the following feeds on legumaceous plants like alfalfa, as well as on apple, birch, chestnut, maples, and others? Species in the genus, *Erythroneura*, feed on sycamore leaves, but also on apple, grape and willow.

- A. Potato leafhopper
- B. Rose leafhopper
- C. Aster or six-spotted leafhopper
- D. None of the above

14. Which of the following feeds on vegetables and annual flowers and spreads the aster yellows virus to woody plants like periwinkle and Thunbergia species?
- A. Potato leafhopper
  - B. Rose leafhopper
  - C. Aster or six-spotted leafhopper
  - D. None of the above

**Symptoms and Diagnosis**

15. Which of the following have a lacy pattern on their upper side, they don't jump or run sideways, and they are about half as broad as they are long? Yet another pest that can cause stippling is the spider mite. Check under leaves for the webbing left by spider mites (leafhoppers don't leave webbing).
- A. Leafhoppers
  - B. Lacebugs
  - C. Grasshoppers
  - D. None of the above

**Planthoppers (Issus) Sub-Section**

16. Which of the following have an enlarged pronotum (shield-like part just behind the head) that extends backward to cover the abdomen; often it is shaped to resemble a thorn or wart on a twig?
- A. Leafhoppers
  - B. Treehoppers
  - C. Spittlebugs and froghoppers
  - D. None of the above
17. Which of the following have 1 or more rows of small spines on the hind tibiae (shin-like segments)? Their bodies tend to be parallel-sided or taper toward the rear.
- A. Leafhoppers
  - B. Treehoppers
  - C. Spittlebugs and froghoppers
  - D. None of the above
18. Which of the following are a lot like leafhoppers but have only 1 or 2 stout spines on the hind tibiae (shin-like segments), plus a small ring of spines at the outer tip of that leg segment? Many species' bodies are widest at the hind end (a little like a resting frog, hence the name froghopper).
- A. Flatid planthoppers
  - B. Treehoppers
  - C. Spittlebugs and froghoppers
  - D. None of the above
19. Which of the following are usually not abundant enough to cause real damage to the health of ornamental plants? Their waxy secretions and the honeydew they excrete disfigure plants and make them sticky to touch.
- A. Flatid planthoppers
  - B. Treehoppers
  - C. Spittlebugs and froghoppers
  - D. None of the above
20. Ecology and Behavior: Planthoppers generally have \_\_\_\_\_ generations per year; however, as many as \_\_\_\_\_ generations per year have been observed in tropical delphacids.
- A. 1 -3 – 12
  - B. 2-5 - 50
  - C. 2-6 - 21
  - D. None of the above

## Topic 6 – Plant Sucking Insects Section –Part 2

### Spider Mites and Predatory Mites Sub-Section

1. Spider mites and predatory mites are tiny \_\_\_\_\_ legged arthropods (larval stages have \_\_\_\_\_ legs).  
A. 8 - 4                      C. 8 - 6  
B. 6 -6                        D. None of the above
2. Each female lays about \_\_\_\_\_ dozen eggs during her life.  
A. 10 -20                    C. 2 – 4  
B. 500 – 1000              D. None of the above
3. Which of the following feed in colonies beneath protective webbing in nests that are formed along midribs and veins on the undersides of avocado leaves? The webbing is a good way to identify these mites. Feeding damage produces circular yellow to dark brown necrotic spots.  
A. Six-spotted mites    C. Avocado brown mite  
B. Persea mites         D. None of the above

### Spittlebugs (Froghoppers) Sub-Section

4. Spittlebugs are the immature stage of several insect species known as froghoppers. Though many types of spittlebugs affect gardens, these froghopper nymphs all have one thing in common: the spittle-like \_\_\_\_\_ that conceals and protects them as they feed on plants.  
A. Foam                      C. Spray  
B. Scale                      D. None of the above
5. Adult spittlebugs are similar to leafhoppers but are \_\_\_\_\_.  
A. Smaller                    C. Green  
B. Fatter                      D. None of the above

### Common Spittlebugs

6. Which of the following spittlebugs feeds primarily on broadleaved herbaceous plants, but it also occurs on woody, deciduous species? At least 400 hosts are known. Adults are robust and blackish, brown, tan, yellow, or a mottled mix of these colors.  
A. Meadow spittlebug            C. Western pine spittlebugs  
B. California spittlebug         D. None of the above

### Stink Bugs Sub-Section

7. Stink bug nymphs are not very mobile and remain in the vicinity of the egg cluster through the \_\_\_\_\_ growth stage (for about 2 weeks).  
A. Fourth                    C. Second  
B. Third                      D. None of the above
8. Small stink bug nymphs may be mostly black are?  
A. Green stink bug    C. Southern green stink bug  
B. Brown stink bug    D. None of the above
9. Small stink bug nymphs that have reddish brown to pale green with black and white stripes on the abdomen are?  
A. Green stink bug    C. Southern green stink bug  
B. Brown stink bug    D. None of the above

### Identifying Brown Marmorated Stink Bugs

10. Adult brown marmorated stink bug usually produces \_\_\_\_\_ generations per year in cooler climates but can lay up to \_\_\_\_\_ generations per year in warmer climates.

- A. 3-4, – 7      C. 5-6, – 12
- B. 1-2,- 5      D. None of the above

### Squash bugs (*Anasa tristis*)

11. The squash bug spends the \_\_\_\_\_ in the \_\_\_\_\_ stage.

- A. Winter – Adult      C. Summer - adult
- B. Winter – Nymph      D. None of the above

12. Female squash bugs lay small clusters of eggs (about \_\_\_\_\_) on the undersides of the leaves, especially between the veins where they form a \_\_\_\_\_.

- A. 50 – Circle      C. 20 – V
- B. 100 – L      D. None of the above

### Tarnished Plant Bugs (*Lygus lineolaris*)

13. Tarnished plant bugs generally have \_\_\_\_\_ generations depending upon the weather.

- A. 2-4      C. 3-4
- B. 4-6      D. None of the above

14. Like other insects in the True bug family, they have the characteristic \_\_\_\_\_ on their back.

- A. Black spot      C. Triangle
- B. V      D. None of the above

### Treehoppers

15. Which of the following adults and last instars are about 2/5 inch long. Nymphs have prominent spines on the back, which is characteristic of treehopper nymphs? Host plants include ash, elm, fruit trees, hawthorn, locust, poplar, and many herbaceous plants (e.g., tomatoes and peppers).

- A. Oak treehopper      C. Threecornered alfalfa hopper
- B. Buffalo treehopper      D. None of the above

16. Which of the following is common in the spring on the lower branches of deciduous and live oaks and occasionally on birch, chestnut, and certain other broadleaf trees? Individuals commonly aggregate in rows on twigs.

- A. Oak treehopper      C. Threecornered alfalfa hopper
- B. Buffalo treehopper      D. None of the above

### Whiteflies Sub-Section

17. Which of the following eggs are oblong, smooth and yellow to amber brown and are laid randomly on the underside of leaves? Nymphs are greenish-yellow, oval and flat. Late third and fourth instars develop distinctive eye spots and are often referred to as red-eyed nymphs.

- A. Citrus blackfly      C. Banded winged Whitefly
- B. Silverleaf Whitefly      D. None of the above

18. Which of the following is an occasional pest, especially in greenhouses? Adults are about the same size as the silverleaf whitefly (0.9- 1.1 millimeter).
- A. Greenhouse Whitefly      C. Banded winged Whitefly  
B. Silverleaf Whitefly      D. None of the above
19. Which of the following wings are held nearly parallel to the leaf and cover the abdomen when at rest? Eggs are occasionally laid in circular patterns on plants with smooth leaves. Eggs are oblong, smooth and are initially yellow but darken before hatching.
- A. Greenhouse Whitefly      C. Banded winged Whitefly  
B. Silverleaf Whitefly      D. None of the above
20. Which of the following is an occasional pest of crops and ornamental plants, especially hibiscus? The adults are slightly larger than silverleaf and greenhouse whiteflies. They can be recognized by two irregularly shaped (in zig-zag pattern) gray bands on the front pair of wings. Except for these banded front wings, the adults are very similar in size and shape to adult greenhouse whiteflies.
- A. Citrus blackfly      C. Banded winged Whitefly  
B. Silverleaf Whitefly      D. None of the above

## Topic 7 – Stinging Insects Section

### Yellowjackets

1. The solitary wasps \_\_\_\_\_ become a problem. Solitary means they do not colonize or form nests where many wasps live together.
- A. Rarely      C. Never  
B. Always      D. None of the above
2. Although they may look threatening, most of them do not defend their nests and \_\_\_\_\_ sting people.
- A. Rarely      C. Never  
B. Always      D. None of the above
3. Which of the following build a hard nest out of mud, usually on ceilings, walls or eaves of buildings? The nests are attended by a single female wasp.
- A. Blue Paper Wasp      C. American yellowjacket  
B. Mud Daubers      D. None of the above
4. Which of the following feeds abundantly on armyworms, corn earworms and other ag pests. Hornets will take house flies, blow flies and caterpillars?
- A. Mud Daubers      C. German yellowjacket  
B. Paper wasp      D. None of the above
5. Which of the following females use vacant mud wasp nests. They hunt on the ground, preying mainly on Black Widow spiders? Adults are metallic blue, blue green or bluish black.
- A. Cricket Wasps      C. Digger Wasps  
B. Blue Mud Wasp      D. None of the above

6. Which species harvests crickets from their hiding places and buries them in a simple nest in the ground? These adults are usually slender, metallic bright blue-green or blue with dark violet-tinged wings.
- A. Cricket Wasps      C. Digger Wasps  
B. Blue Mud Wasp      D. None of the above
7. Which of the following wasps have a wide range of prey? They build simple, one cell vertical burrows and will use a rock to cover the entrance. The adults are very slender, have a long thread-waist, a black thorax marked with silver, and a gray or silvery abdomen with an orange or reddish tip.
- A. Cricket Wasps      C. Digger Wasps  
B. Blue Mud Wasp      D. None of the above
8. Which of the following is a common wasp? Females build a mud nest of cells laid side by side usually in a series of two to six, on the sides and eaves of buildings. The adults are mostly black with a yellow waist and legs.
- A. Cricket Wasps      C. Digger Wasps  
B. Mud dauber          D. None of the above
9. Which of the following can usually be found in sandy areas as their name suggests? The females build large tunnels and feed on flies. The adults are stout-bodied; gray or black with pale to bright yellow markings.
- A. Cricket Wasps      C. Digger Wasps  
B. Sand wasp            D. None of the above
10. Cicada killers, are the most common species of \_\_\_\_\_.
- A. Cricket Wasps      C. Digger Wasps  
B. Sand wasp            D. None of the above
11. Umbrella wasps are also commonly referred to as \_\_\_\_\_. These wasps have been named umbrella wasps because their nests are the shape of an inverted umbrella.
- A. Paper wasps          C. Digger Wasps  
B. Blue Mud Wasp      D. None of the above
12. Which of the following usually have small nests and are usually inhabited by about 250 wasps? Unlike many other wasps and yellowjackets.
- A. Cricket Wasps      C. Digger Wasps  
B. Umbrella wasps      D. None of the above
13. Which of the following do not have a worker caste? All female wasps are capable of becoming the queen.
- A. Cricket Wasps      C. Umbrella wasps  
B. Blue Mud Wasp      D. None of the above
14. Which of the following are the fertile female which starts the colony and lays eggs?
- A. Queen                C. New queens  
B. Drones                D. None of the above
15. Which of the following are infertile females which do all work except laying eggs?
- A. Workers              C. New queens  
B. Drones                D. None of the above

16. Which of the following are males, which have no stingers, and are born from unfertilized eggs?

- A. Workers
- B. Drones
- C. New queens
- D. None of the above

17. Which of the following are fertile females, each of which, once fertilized, may start its own nest in the spring?

- A. Workers
- B. Drones
- C. New queens
- D. None of the above

18. Characteristics of Hemiptera include: Antennae are fairly long and contain \_\_\_\_\_ segments

- A. 2 -3
- B. 6-8
- C. 4-5
- D. None of the above

19. Characteristics of Hemiptera include: Simple metamorphosis with mostly \_\_\_\_\_ nymphal instars

- A. 2
- B. 5
- C. 3
- D. None of the above

20. Characteristics of Hemiptera include that most species are \_\_\_\_\_ but some are

- A. Terrestrial – Aquatic
- B. Crawlers – Flyers
- C. Social – Independent
- D. None of the above

## Topic 8 - Soil Insects Section

### Billbugs (snout beetles)

1. The hibernating adults become active in late-April to mid-May when the soil surface temperatures rise above \_\_\_\_\_ °F.

- A. 70
- B. 60
- C. 50
- D. None of the above

### Carrot Rust Fly (*Chamaepsila rosae*)

2. Females lay up to \_\_\_\_\_ eggs on the soil surface, near the base of plants in clusters of 1 to 3 eggs.

- A. 400
- B. 50
- C. 40
- D. None of the above

### Click Beetles (Wireworms)

3. Biology varies by species. In general, \_\_\_\_\_ overwinter in the ground, becoming active in the spring.

- A. Larvae
- B. Adults and larvae
- C. Adults
- D. None of the above

### Corn Rootworm (4 Primary species)

4. Which rootworm beetles are pale yellow to tan when they first emerge from the soil but soon darken to light green? They are about ¼ inch long.

- A. Northern corn
- B. Southern corn
- C. Western corn
- D. None of the above

5. Which rootworm beetles have alternating black and yellow stripes running lengthwise on the wing covers; these black stripes converge to various degrees on the males?

- A. Northern corn      C. Western corn
- B. Southern corn     D. None of the above

6. Which rootworm beetle (also known as the 12-spotted cucumber beetle) has conspicuous black spots on its wing covers?

- A. Northern corn      C. Western corn
- B. Southern corn     D. None of the above

### Ground Beetles

7. Ground beetles is about 1/8 - 1/4 inches long (a few can become as large as 1/2 inch in length).

- A. True                B. False

### Horsehair worms

8. Horsehair or gordian worms are dangerous to people in all stages of their lives.

- A. True                B. False

### May and June beetles (*Phyllophaga* spp., *Polyphylla* spp.)

9. The last larval stage remains in the soil from the fall through spring. In spring and early summer, white grubs pupate \_\_\_\_\_ inches deep in the soil.

- A. 3 to 4              C. 2 to 5
- B. 3 to 6              D. None of the above

10. Adults emerge from pupae in about \_\_\_\_\_ weeks. There is one generation per year, but in some cooler areas, development may take two years.

- A. 3                    C. 5
- B. 6                    D. None of the above

### Mole crickets

11. The tawny mole cricket is grayish brown with four pale spots on the pronotum, while the southern mole cricket is often golden brown with a mottled brown pronotum.

- A. True                B. False

### Nematodes

12. When nematodes eat bacteria or fungi, ammonium (NH<sub>4</sub><sup>+</sup>) is released because \_\_\_\_\_ contain much more nitrogen than the nematodes require.

- A. Omnivores                      C. Predatory nematodes
- B. Bacteria and fungi              D. None of the above

### Scarab beetles

13. Scarab beetles' larvae of most scarab beetles are brownish, S-shaped grubs that live underground or in other protected places.

- A. True                B. False

14. Scarab beetles' heads are often green, and they have four pairs of legs.

- A. True                B. False

### Southwestern masked chafer (*Cyclocephala hirta*)

15. Mated females dig down four to six inches and lay \_\_\_\_\_ eggs. If soil moistures are sufficient, the eggs swell within eight days and hatch in 14 to 18 days at 70 to 75°F.

- A. 11 to 14
- B. 20 to 25
- C. 5 -7
- D. None of the above

16. The second instars are reached in \_\_\_\_\_ days at \_\_\_\_\_°F and third instars are common by September.

- A. 20 to 24, 78
- B. 20 to 24, 80
- C. 15-20, 75
- D. None of the above

### Sowbugs aka Pillbugs

17. Sowbugs and pillbugs range in size from 1/4 to 1/2 inch long and are dark to slate gray. Their oval, segmented bodies are convex above but flat or concave underneath. They possess seven pairs of legs and two pairs of antennae (only one pair of antennae is readily visible).

- A. True
- B. False

### Springtails - Collembola

18. Many springtails are opportunistic species capable of rapid population growth. Under favorable conditions they can reach densities of more than \_\_\_\_\_ individuals per square \_\_\_\_\_.

- A. 500- yard
- B. 1,000 – inch
- C. 100 – Centimeter
- D. None of the above

### Wood Cockroaches

19. The wings of the wood roach females extend slightly beyond the tip of the abdomen. The males' wings cover only half of the abdomen, and nymphs are winged.

- A. True
- B. False

20. Wood roach males are usually plain brown and 2 inches or more in length.

- A. True
- B. False

## Topic 9 - Worker Protection Standard Introduction Section

### General Duties of WPS

The general duties of the WPS require an agricultural employer or a pesticide handler-employer to:

1. Assure that each worker and handler subject to the standard receives the \_\_\_\_\_.

- A. Provisions of this standard
- B. Required protections
- C. Labeling of the pesticide
- D. None of the above

2. Require each person who supervises any worker or handler to assure compliance by the worker or handler with the provisions of this standard and to assure that the worker or handler receives the \_\_\_\_\_ (40 CFR).

- A. Provisions of this standard
- B. Required protections
- C. Labeling of the pesticide
- D. None of the above

3. Which of the following prohibit agricultural and handler employers from taking any retaliatory actions against workers attempting to comply with this standard, or from taking any action that prevents or discourages any worker or handler from complying or attempting to comply with the WPS?

- A. The general duties
- B. Required protections
- C. Labeling of the pesticide
- D. None of the above

**Who is Covered by the 2015 WPS?**

4. Which of the following are those who mix, load, or apply agricultural pesticides; clean or repair pesticide application equipment; or assist with the application of pesticides?

- A. Agricultural workers
- B. Handlers- Workers
- C. Pesticide handlers
- D. None of the above

5. Which of the following are those who perform tasks related to growing and harvesting plants on farms or in greenhouses, nurseries, or forests?

- A. Agricultural workers
- B. Handlers- Workers
- C. Pesticide handlers
- D. None of the above

**WPS Protection**

6. To ensure that employees will be protected from exposures to pesticides, the WPS requires employers to protect early-entry workers who are doing permitted tasks in treated areas during an REI, including \_\_\_\_\_ related to correct use of PPE,

- A. Narrow exceptions
- B. Special situation
- C. Special instructions and duties
- D. None of the above

7. To ensure that employees will be protected from exposures to pesticides, the WPS requires employers to notify workers about \_\_\_\_\_ so they can avoid inadvertent exposures.

- A. Exposures to pesticides
- B. Treated areas
- C. Monitoring
- D. None of the above

8. To ensure that employees will be protected from \_\_\_\_\_, the WPS requires employers to protect handlers during handling tasks, including monitoring while handling highly toxic pesticides, and duties related to correct use of PPE.

- A. Exposures to pesticides
- B. Inadvertent exposures
- C. Monitoring while handling pesticides
- D. None of the above

**Mitigation**

9. Handler means any person, including a self-employed person, who is employed for any type of compensation and who is performing activities relating to the production of agricultural plants on an agricultural establishment.

- A. True
- B. False

**Pesticide Handlers**

10. A person is a handler if he or she only handles pesticide containers that have been emptied or cleaned according to instructions on pesticide product labeling or, if the labeling has no such instructions, have been triple-rinsed or cleaned by an equivalent method, such as pressure rinsing.

- A. True
- B. False

## Topic 10- PPE, Safety and Health Section

### Personal Protective Equipment (PPE)

1. Which of the following must supply handlers with personal protective equipment (PPE) as required by the pesticide label. All PPE should be stored in an area separate from pesticides?

- A. Applicators      C. Employers
- B. Handlers        D. None of the above

2. \_\_\_\_\_ are responsible for making sure handlers wear the proper PPE.

- A. Applicators      C. Employers
- B. Handlers        D. None of the above

3. When the PPE requirement falls under the WPS, the employer has the following responsibilities:

Provide PPE to each early entry \_\_\_\_\_.

- A. Applicators      C. Worker or handler
- B. Handlers        D. None of the above

4. When the PPE requirement falls under the WPS, the employer has the following responsibilities:

Provide soap, single-use towels, and water to each \_\_\_\_\_ at the end of any handling activity when PPE is removed.

- A. Person            C. Worker
- B. Handler         D. None of the above

### §170.240 Personal Protective Equipment

5. Requirement. Any \_\_\_\_\_ who performs tasks as a pesticide handler shall use the clothing and personal protective equipment specified on the labeling for use of the product.

- A. Handler          C. Worker
- B. Person           D. None of the above

### Definition.

6. Long-sleeved shirts, short-sleeved shirts, long pants, short pants, shoes, socks, and other items of work clothing are considered personal protective equipment.

- A. True              B. False

### Personal Protective Equipment Requirements      Citation 28 &33.a.

7. Personal protective equipment (PPE) is worn to protect the body from contact with pesticides, for example respirator, chemical resistant gloves, and protective eyewear. The pesticide label indicates what PPE must be worn. PPE must be provided in clean and operating condition, and employers must make sure it is worn correctly.

- A. True              B. False

8. PPE must be inspected before each day of use and any damaged PPE either repaired or discarded. PPE must be cleaned at the end of the day or before reuse.

- A. True              B. False

9. Any contaminated PPE must be can be washed with any other clothing or laundry. PPE is not considered contaminated with any use around pesticides or in a treated area.  
A. True                      B. False

**§170.505 Requirements during Applications to Protect Handlers, Workers, and other Persons**

10. Handlers using highly toxic pesticides. The handler employer must ensure that any handler who is performing any handler activity with a pesticide product that has the skull-and-crossbones symbol on the front panel of the pesticide product label is monitored visually or by voice communication at least every \_\_\_\_\_ hours.  
A. 2                      C. 24  
B. 4                      D. None of the above

**Topic 11 - WPS Required Training Section**

**§170.405 Entry Restrictions Associated with Pesticide Applications**

1. The application exclusion zone is the area that extends \_\_\_\_\_ feet horizontally from the application equipment in all directions during application when the pesticide is applied.  
A. 100                      C. 500  
B. 50                      D. None of the above

2. The application exclusion zone is the area that extends \_\_\_\_\_ feet horizontally from the application equipment in all directions during application when the pesticide is applied not as in §170.405(a)(1)(i)(A)-(D) and is sprayed from a height of greater than \_\_\_\_\_ inches from the planting medium using a spray quality (droplet spectrum) of medium or larger (volume median diameter of 294 microns or greater).  
A. 50 – 6                      C. 25 – 6  
B. 25 – 12                      D. None of the above

**Worker Training 2018**

3. The pesticide safety training for workers under the revised WPS (subparts D, E, F and G of 40 CFR Part 170) must be presented orally at a location that is reasonably loud during work.  
A. True                      B. False
4. The responsibility of agricultural employers to provide workers and handlers with a paycheck and not information and protections designed to reduce work-related pesticide exposures and illnesses.  
A. True                      B. False
5. A worker or handler may designate in writing a representative to request access to pesticide application and hazard information.  
A. True                      B. False
6. Routine and emergency decontamination procedures, including emergency eye flushing techniques, and if pesticides are spilled or sprayed on the body to use decontamination supplies to wash immediately or rinse off in the nearest clean water, including springs, streams, lakes or other sources if more readily available than decontamination supplies, and as soon as possible, wash or shower with soap and water, shampoo hair, and change into clean clothes.  
A. True                      B. False

**2018 Handler Training Citations. 27-37.**

7. Handlers must be at least \_\_\_\_\_ years old.

- A. 16                      C. 21
- B. 18                      D. None of the above

**Pesticide Safety, Application and Hazard Information**

8. The EPA WPS safety poster (or equivalent) where decontamination supplies are located at permanent sites and where decontamination supplies are provided for \_\_\_\_\_ or more workers. 170.311 (a)(5)

- A. 11                      C. 15
- B. 25                      D. None of the above

9. Display the EPA WPS safety poster or equivalent information before an application takes place and for \_\_\_\_\_ days after the REI expires. 170.309 (h)

- A. 10                      C. 30
- B. 15                      D. None of the above

10. Display the SDS and application information within \_\_\_\_\_ hours of the application and before workers enter treated areas. This information must be displayed for \_\_\_\_\_ days after the REI expires and kept in records on the agricultural establishment until \_\_\_\_\_ years after the REI expires. 170.309 (h)&(l) and 170.311 (b)(5)-(6)

- A. 24 – 10 -5                      C. 24 – 30 - 2
- B. 12- 30- 3                      D. None of the above

11. Provide the SDS and application information upon request of a worker, handler, designated representative or medical personnel, within \_\_\_\_\_ days. 170.311 (b)(7)-(9)

- A. 10                      C. 30
- B. 15                      D. None of the above

**Decontamination Supplies**

12. \_\_\_\_\_ gallon(s) of water per worker and \_\_\_\_\_ gallon(s) of water per handler at the beginning of each work period for routine and emergency decontamination,

- A. 3 – 1                      C. 1 – 5
- B. 1 – 3                      D. None of the above

13. When a product requires protective eyewear for **handlers**, and/or when using a closed system under pressure, provide the following in mixing and loading areas: a system that can deliver gently running water at \_\_\_\_\_ gallons per minute for at least \_\_\_\_\_ minutes or \_\_\_\_\_ gallons of water in containers suitable for providing a gentle eye-flush for about 15 minutes. 170.509 (d)(1)

- A. 10 – 15 – 6                      C. 0.4 – 15 – 6
- B. 0.4 – 5 – 1                      D. None of the above

14. When applying a product that requires protective eyewear, provide \_\_\_\_\_ pint(s) of water per **handler** in portable containers that are immediately available to each handler. 170.509 (d)(2)

- A. 3                      C. 5
- B. 1                      D. None of the above

### Employer Information Exchange

15. Owners/operators of agricultural establishments must make sure any commercial pesticide handler employer they hire is aware of: Specific location and description of any treated areas where an REI is in effect that the commercial handler may be in or walk within \_\_\_\_\_ mile.

- A.  $\frac{1}{4}$
- B. 1
- C.  $\frac{1}{2}$
- D. None of the above

### Emergency Assistance

16. If there is reason to believe a worker or handler has been exposed to pesticides, during or within \_\_\_\_\_ hours of employment, and needs emergency medical treatment, employers must promptly make transportation available to an appropriate emergency medical facility.

- A. 72
- B. 24
- C. 48
- D. None of the above

### Notice About Applications 170.409 (a)

17. If not, post warning signs if the REI is **greater than**: \_\_\_\_\_ hours for outdoor production or \_\_\_\_\_ hours for enclosed space production.

- A. 72 -10
- B. 24 -8
- C. 48 -4
- D. None of the above

### Application Restrictions and Monitoring 170.505

18. When anyone is handling a highly toxic pesticide with a skull and crossbones, maintain sight or voice contact every \_\_\_\_\_ hours.

- A. 2
- B. 4
- C. 1
- D. None of the above

### Labeling Information Sub-Section

19. A handler employer must assure that handlers understand all of the labeling requirements related to safe use of pesticides before any handling activity takes place. The handler must also have access to the product labeling information during \_\_\_\_\_.

- A. Handling activities
- B. Product use
- C. Problems
- D. None of the above

### §170.309 Agricultural Employer Duties 2015-2018 Rule

20. Agricultural employers must: Provide emergency assistance in accordance with this paragraph. If there is reason to believe that a worker or handler has experienced a potential pesticide exposure during his or her employment on the agricultural establishment or shows symptoms similar to those associated with acute exposure to pesticides during or within \_\_\_\_\_ hours after his or her employment on the agricultural establishment, and needs emergency medical treatment, the agricultural employer must do all of the following promptly after learning of the possible poisoning or injury:

- A. 10
- B. 72
- C. 24
- D. None of the above

The Assignment must be submitted to TLC by December 27 in order to be submitted to DPR by the 30th. If it is late, you will be penalized \$50 per day.

## Agricultural Applicator Assignment #4 - T-Z Last Names

You will have 90 days from the start of this course to have successfully passed this assignment with a score of 80%. You may e mail the answers to TLC, info@tlch2o.com or fax the answers to TLC, (928) 272-0747. This assignment is available to you in a Word Format on TLC's Website. You can find online assistance for this course on the in the Search function on Adobe Acrobat PDF to help find the answers. Once you have paid the course fee, you will be provided complete course support from Student Services (928) 468-0665.

**Write your answers on the Answer Key found in the front of this assignment.**

We will require all students to fax or e-mail a copy of their driver's license with the registration form.

Multiple Choice, Please select one answer and mark it on the answer key. The answer must come from the course text. (s) Means answer can be plural or singular.

Please write down any problems with questions.

### Topic 1 - Crop Chewing Insects Section – Part 1

#### Alfalfa Caterpillar (*Colias eurytheme*)

1. The adults of the alfalfa caterpillar are the familiar yellow butterflies that can be seen flying over alfalfa, soybean, and other flowering fields, particularly in \_\_\_\_\_. The undersides of the wings are solid yellow; the topside of the wings are bordered in \_\_\_\_\_.

- A. August - black
- B. July - Red
- C. May - Yellow
- D. None of the above

2. The butterflies lay eggs singly on the undersides of leaves. A female can lay \_\_\_\_\_ eggs. The eggs hatch from 3 to 5 days.

- A. 1,000 – 2,000
- B. 200 to 500
- C. 75-100
- D. None of the above

#### Beet Armyworm (*Spodoptera exigua*)

3. Older caterpillars are green to almost \_\_\_\_\_ with stripes along each side.

- A. Yellow
- B. Black
- C. White
- D. None of the above

4. Each moth can lay up to \_\_\_\_\_ eggs during their week-long life although some may live up to \_\_\_\_\_ days.

- A. 600 – 30
- B. 500 – 60
- C. 1,000 – 45
- D. None of the above

#### Blister Beetles (Insecta: Coleoptera: Meloidae)

5. A few species have rounded "ball-like" abdomen or short wings and a larva-form abdomen. All blister beetles, however, have the distinctive narrow " \_\_\_\_\_ " which contrasts with the broader head and abdomen.

- A. Head
- B. Neck
- C. Abdomen
- D. None of the above

**Boil Weevil (*Anthonomus grandis*)**

6. *A. grandis* spends the \_\_\_\_\_ in an adult reproductive dormancy where it subsists without food until it returns to cotton in the early \_\_\_\_\_.

- A. Spring – Winter    C. Summer - Fall
- B. Winter – Spring    D. None of the above

7. The larva feeds for \_\_\_\_\_ days before pupating inside the square or small boll. During the next \_\_\_\_\_ days the pupal stage changes into an adult.

- A. 5 -10, 7 -10                      C. 10- 14, 4 to 6
- B. 7 to 14, 4 to 6                      D. None of the above

**Cabbage Looper (*Trichoplusia ni*)**

8. Cabbage looper eggs are hemispherical in shape, with the flat side affixed to foliage. They are deposited singly on either the upper or lower surface of the leaf, although clusters of \_\_\_\_\_ eggs are not uncommon.

- A. 6 to 7            C. 60 to 70
- B. 50 to 75        D. None of the above

**Celery Leaf-tier (*Udea rubigalis*)**

**Thresholds**

9. At five different locations in planting inspect 20 plants for larvae on a weekly basis. If more than 4 weeks before harvest and there are \_\_\_\_\_ or more larvae per \_\_\_\_\_ plants, treatment is warranted.

- A. 2 -100                      C. 6 -20
- B. 100 -20                      D. None of the above

**Clover Root Curculio (*Sitona hispidulus* F.)**

10. The clover root curculio life cycle is similar to alfalfa weevil in that the adults leave the alfalfa fields and spend the \_\_\_\_\_ in protected areas.

- A. Winter            C. Spring
- B. Summer        D. None of the above

11. Clover root curculio is most likely to be found in June and is apparently more common in \_\_\_\_\_ soils than in the \_\_\_\_\_ soils.

- A. Heavier, sandy                      C. Sandy, lighter
- B. Sandy, heavier                      D. None of the above

**Cotton Bollworm (*Helicoverpa armigera*)**

12. Eggs are the size of a pinhead, white to cream colored and hatch in \_\_\_\_\_ days during warm weather.

- A. 2 to 3            C. 3 to 4
- B. 3 to 6            D. None of the above

13. The full-grown larva is about 1½ inches long with a light-colored head capsule. The predominant body color may range from \_\_\_\_\_ to various shades of tan or dark brown.

- A. Pink or green                      C. Pink to white
- B. Purple or orange                      D. None of the above

### Cucumber Beetle

14. Adult spotted cucumber beetle - Larvae of both species are small (3/8 in) and \_\_\_\_\_ colored. Eggs of both species are \_\_\_\_\_ and are laid in groups.
- A. Creamy white, pale orange-yellow      C. Creamy white, Brown – Pale green  
B. Creamy white, Brown - White      D. None of the above

### Cutworms

15. The larvae are dingy, grayish-black and smooth-skinned and may reach \_\_\_\_\_ inches in length.
- A. 3      C. 2  
B. 1      D. None of the above

### Earwig (*Forficula auricularia*)

16. Adults overwinter in the soil. Females lay \_\_\_\_\_ cream-colored eggs in underground nests during January and February, and the newly hatched young (nymphs) first appear in April.
- A. 20-50      C. 500-1,000  
B. 100-500      D. None of the above

### Earworms and hornworms

17. Adults of most hornworms (including the “tomato” hornworms) fly after dawn and are always observed except occasionally at porch lights.
- A. True      B. False

### European Corn Borer (*Ostrinia nubilalis*)

18. Eggs are deposited in irregular clusters of about \_\_\_\_\_. The eggs are oval, flattened, and creamy white in color, usually with an iridescent appearance. The eggs darken to a beige or orangish tan color with age.
- A. 15 to 20      C. 20-50  
B. 50 -100      D. None of the above

19. Male moths are pale yellow to light brown in color, with both the forewing and hind wing crossed by dark zigzag lines and bearing pale, often yellowish, patches.
- A. True      B. False

20. The female is darker in color, usually pale brown or grayish brown, but also with dark zigzag lines and yellowish patches.
- A. True      B. False

## Topic 2 - Crop Chewing Insects Section – Post Quiz Part 2

### Flea Beetles (Scientific Name: Varies Order: Coleoptera)

1. Flea beetles can be red, yellow to metallic gray.
- A. True      B. False

### Life History

2. In the \_\_\_\_\_, the adults migrate out of their overwintering site as soon as adequate vegetation is available for feeding and egg deposition.

- A. Spring      C. Summer
- B. Winter      D. None of the above

### Flea Weevil

3. Adults emerge later in the \_\_\_\_\_ and feed until fall.

- A. Spring      C. Summer
- B. Winter      D. None of the above

### Four-lined Plant Bug (*Poecalocapsus linectus*)

4. The adult four-lined plant bug (*Poecalocapsus linectus*) is a 1/4 inch long, yellowish to yellowish-green True bug with four longitudinal black lines down the wing covers and black antennae. This plant bug looks somewhat like a spotted cucumber beetle.

- A. True      B. False

### Fruit fly / *Drosophila* Flies

5. Various species of *Drosophila* are known as vinegar or pomace flies. In vineyards more than \_\_\_\_\_ % are *D. melanogaster* and *D. simulans*.

- A. 50      C. 25
- B. 95      D. None of the above

### Fungus gnats (*Orfelia* and *Bradysia* species)

6. The adults are tiny, flying insects about 1/16 to 1/8 inch long. They look a little like small mosquitoes with gray bodies and long, slender legs. The wings are usually clear. The insects have \_\_\_\_\_ that are larger than their \_\_\_\_\_.

- A. Head - segmented antennae      C. Segmented antennae - Body
- B. Segmented antennae – Head      D. None of the above

### Ground Mealybug (*Rhizoecus kondonis*)

7. The best place to monitor for ground mealybug is right at the line between healthy and unhealthy plants. Look for bright white tiny insects that crawl around the roots, about \_\_\_\_\_ inches in the soil.

- A. 6 -12      C. 1-2
- B. 4-6      D. None of the above

### Hessian Fly (*Mayetiola destructor*)

8. \_\_\_\_\_ will trigger fly emergence in early \_\_\_\_\_. Farmers who plant winter wheat early will have young wheat in the seedling stage when the flies emerge.

- A. Rain – June      C. Wind – September
- B. Rain – September      D. None of the above

9. A single larva, feeding for just \_\_\_\_\_ days, is capable of stunting a young wheat plant or tiller.

- A. 3      C. 5
- B. 7      D. None of the above

**Japanese beetles (*Popillia japonica*)**

10. Japanese beetles feed on the leaves, flowers or fruit of more than \_\_\_\_\_ species of plants.

- A. 300
- B. 30
- C. 400
- D. None of the above

**Leaf miners**

11. There may be several generations of leafminers per year. However, the \_\_\_\_\_ generation is often the most damaging.

- A. First
- B. Second
- C. Third
- D. None of the above

**Mexican bean beetle (*Epilachna Varivestis*)**

12. Eggs are approximately 1.3 mm in length and 0.6 mm in width, and are pale yellow to orange-yellow in color. They are typically found in clusters of \_\_\_\_\_ on the undersides of bean leaves.

- A. 300 -400
- B. 50 -100
- C. 40 to 75
- D. None of the above

13. The newly-hatched larva is light \_\_\_\_\_ in color and not over 1.6 mm in length. The body is covered with rows of stout branched spines, arranged in \_\_\_\_\_ longitudinal rows on the backs.

- A. Yellow, six
- B. Bronze, eight
- C. Red, four
- D. None of the above

**Pale-Striped Flea Beetle (*Systema blanda*)**

14. The pale-striped flea beetle, *Systema blanda*, is a small, 3/16-inch beetle that invades peppers early in the season.

- A. True
- B. False

**Pea Aphid (*Acyrtosiphon pisum*)**

15. Up to \_\_\_\_\_ generations develop during the season. The entire life cycle takes about \_\_\_\_\_ days.

- A. 3, 12
- B. 12, 3
- C. 20, 12
- D. None of the above

**Pepper maggot (PM) (*Zonosemata electa*)**

16. Maggots reach about ½ inch in length over a period of about \_\_\_\_\_ weeks, and have no distinct head capsule. When they are ready to pupate, they exit at the blossom end, leaving tiny round exit holes. These holes allow for the entry of pathogens into the fruit.

- A. Two
- B. Three
- C. Four
- D. None of the above

**Seedcorn beetles (*Stenolophus lecontei*)**

17. Seeds are the primary food source for seedcorn beetles.

- A. True
- B. False

**Slugs**

18. Eggs hatch the following \_\_\_\_\_:

- A. Spring and early summer
- B. Winter and spring
- C. Summer and Fall
- D. None of the above

### Snails

19. Slugs reach maturity after about 3 to 6 months, depending on the species, and lay translucent oval to round eggs in batches of \_\_\_\_\_ beneath leaves, in soil cracks, and in other protected areas.

- A. 30 -300
- B. 300 -500
- C. 3- 40
- D. None of the above

### Spider Mites

20. Immatures resemble adults (except they are much smaller), and the newly hatched larvae have only \_\_\_\_\_ legs. The other immature stages have \_\_\_\_\_ legs.

- A. 8 – 2
- B. 6 – 4
- C. 6 -8
- D. None of the above

## Topic 3 - Crop Chewing Insects Section – Post Quiz Part 3

### Stem borers (Rice Destroyers)

1. Striped stemborer is one of the most important insect pests in Asia. Its damage can be as high as \_\_\_\_\_% when severe.

- A. 20
- B. 50
- C. 100
- D. None of the above

2. Gold-fringed stemborer can cause yield loss of about \_\_\_\_\_%.

- A. 20
- B. 50
- C. 30
- D. None of the above

### Squash vine borer (*Melittia satyriniformis*)

3. Eggs are flat, brown, and about \_\_\_\_\_ inch long.

- A.  $\frac{1}{2}$
- B.  $\frac{3}{4}$
- C.  $\frac{1}{25}$
- D. None of the above

### Sweet Potato Weevil (*Cylas formicarius*)

4. Temperature is the principal factor affecting larval development rate, with larval development (not including the pre-pupal period) occurring in about \_\_\_\_\_ days at 30° and 24° C, respectively. The larva creates winding tunnels packed with fecal material as it feeds and grows.

- A. 10 and 35
- B. 35 to 40
- C. 7 to 10
- D. None of the above

5. Duration of the pupal stage averages \_\_\_\_\_ days, but in cool weather it may be extended to up to 28 days.

- A. 10 and 35
- B. 35 to 40
- C. 7 to 10
- D. None of the above

### Sweetpotato Whitefly - Silverleaf Whitefly (*Bemisia tabaci*)

6. Adult whiteflies emerge through a \_\_\_\_\_-shaped slit in the integument of the last nymphal instar.

- A. C
- B. T
- C. V
- D. None of the above

### **Threecornered Alfalfa Hopper (*Spissistilus festinus*)**

7. The threecornered alfalfa hopper adult is a \_\_\_\_\_, robust, wedge-shaped insect with clear wings. The body is about 0.25 inch (6.4 mm) long, is higher and wider at the head and tapers towards the end.

- A. Brown      C. Bronze
- B. Green      D. None of the above

8. \_\_\_\_\_ are grayish to straw colored white and soft bodied, with a line of saw-toothed spines on their backs.

- A. Nymphs      C. Pre-pupa
- B. Adults      D. None of the above

### **Thrips**

9. Immatures (called larvae or nymphs) are oblong or slender and elongate and lack wings.

- A. Nymphs      C. Larvae or nymphs
- B. Adults      D. None of the above

### **Webworms (*Hyphantria cunea*)**

10. Webs can cover leaves, clusters of leaves or leaves on whole branches, becoming several feet in diameter. They contain many hairy caterpillars that hatched from one egg mass. Some trees can have a high number of webs.

- A. True      B. False

11. Caterpillars grow to about 1 inch long, with black or reddish heads, pale yellow or greenish bodies marked with a broad mottled stripe containing \_\_\_\_\_ (tubercles) down the back (one pair on each body segment) and yellowish patterns on the sides. They are covered with tufts of long whitish hairs.

- A. Two rows of green bumps      C. Two rows of black bumps
- B. Two rows of red bumps      D. None of the above

### **Bean Weevil (*Acanthoscelides obtectus*)**

12. The broad bean weevil damages stored beans.

- A. True      B. False

### **The location of eggs varies depending on the weevil:**

13. Which of the following eggs glued to the bean or the pod?

- A. Cowpea weevil      C. Broad bean weevil
- B. Bean weevil      D. None of the above

### **Weevils (Alfalfa and Egyptian Alfalfa)**

14. Larvae complete their growth in about \_\_\_\_\_ weeks. They will then spin a cocoon and pupate either in the leaves of the plant or on the ground.

- A. 1 to 2      C. 4 to 6
- B. 3 to 4      D. None of the above

15. Both weevils spend the summer as adults under the loose bark of trees, especially eucalyptus, or in any place they can wedge their bodies, such as in rough-barked trees (walnut) or under shake shingles on homes.

- A. True      B. False

### Western Yellowstriped Armyworm (*Spodoptera Praefica*)

16. The eggs are \_\_\_\_\_ in color and bear 45–58 small ridges.  
A. Greenish white      C. Greenish to pinkish brown  
B. Golden brown      D. None of the above
17. Females typically deposit clusters of \_\_\_\_\_ eggs, usually on the underside of leaves. Total fecundity was determined to be over 3000 eggs under laboratory conditions.  
A. 100- 400      C. 500- 1,000  
B. 200–500      D. None of the above
18. The eggs are covered with scales from the body of the adults. Duration of the egg stage is \_\_\_\_\_ days at warm temperatures.  
A. 3 -5      C. 7-9  
B. 5-7      D. None of the above
19. \_\_\_\_\_ pupate in the soil within a cell containing a thin lining of silk. The reddish brown pupa measures about 18 mm in length.  
A. Nymph      C. Larvae  
B. Adult      D. None of the above
20. Duration of the pupal stage is \_\_\_\_\_ days, normally averaging \_\_\_\_\_ days.  
A. 9-12, 12-15      C. 9-22, 12-18  
B. 5-7, 11-15      D. None of the above

### Topic 4 - Hoppers Section

1. \_\_\_\_\_ grasshoppers mostly hop and they have small and weak wings hence they cannot fly for long distances.  
A. Male      C. Female  
B. Both sexes      D. None of the above

#### Locust Verses Grasshoppers

2. The locust is a type of a grasshopper which is \_\_\_\_\_. The grasshopper is not a type of a locust. Both belong to the order Orthoptera.  
A. Short horned      C. Long winged  
B. Long horned      D. None of the above
3. The grasshopper belongs to the suborder known as Caelifera while the locust belongs to the suborder Acrididae. The grasshopper has \_\_\_\_\_ distinct families while the locust has only 1 family.  
A. 41      C. 28  
B. 28      D. None of the above
4. Locusts can exist in two different behavioral states which are \_\_\_\_\_ while grasshoppers do not.  
A. Migratory and gregarious      C. Migratory and non-gregarious  
B. Non- migratory and gregarious      D. None of the above

5. Grasshoppers have stronger wings than locusts.  
A. True      B. False

6. Locusts primarily feed upon grasses.  
A. True      B. False

### **Grasshopper Life Cycle**

7. Typically, a female grasshopper will lay about \_\_\_\_\_ eggs during the summer and fall.  
A. 700      C. 100  
B. 40-70      D. None of the above

8. Extended cool temperatures (less than \_\_\_\_\_°F) and rainy weather during this period can result in severe nymphal mortality due to starvation.  
A. 65      C. 75  
B. 40      D. None of the above

9. Grasshopper nymphs go through \_\_\_\_\_ stages or instars.  
A. 3      C. 5  
B. 4      D. None of the above

10. Adult grasshoppers, the only stage with wings, can readily move out of hatching areas. Hoppers begin egg laying one to three weeks after reaching the adult stage and may live two to three months, depending on the late summer and early fall weather. All developmental stages are influenced by\_\_\_\_\_.  
A. Weather      C. Moisture  
B. Food source      D. None of the above

### **Predator Avoidance**

11. Grasshoppers employ a wide range of mechanisms to keep from being eaten. The foremost of these is \_\_\_\_\_, matching the background in color or texture.  
A. Cryoiosis      C. Caryopsis  
B. Crypsis      D. None of the above

### **Locust and Grasshopper Insecticide Control Sub-Section**

12. \_\_\_\_\_ is the only insecticide among these that is used as bait to control grasshopper populations.  
A. Malathion      C. Carbaryl  
B. Dimilin      D. None of the above

### **Grasshopper Management Strategies**

13. Where the grasshopper source covers a large area and outbreak populations are expected, the best strategy may be to attempt grasshopper control in the surrounding hatching area while the grasshoppers are small and easily controlled (by late June).  
A. True      B. False

14. Where populations are expected to be extreme, consider not planting a garden for a year (this may be the least frustrating solution to a very difficult situation) or plant early-maturing varieties or vegetables that are less attractive to grasshoppers (e.g. tomatoes and squash).  
A. True      B. False

### Locust Sub-Section

15. The transition from the solitary phase in locusts is triggered by the secretion of the hormone \_\_\_\_\_ which has been linked to boosting moods in humans.

- A. Malathion
- B. Estrone
- C. Serotonin
- D. None of the above

16. The morphological structure of the locust does not differ from the grasshoppers. They are solitary animals but during \_\_\_\_\_ conditions, they form swarms. While in this form they transform their body shape, color, state of fertility, and behavior.

- A. Favorable
- B. Unfavorable
- C. Warm
- D. None of the above

### House Crickets (*Acheta domesticus*)

17. House crickets are known for their loud chirping which is caused when males rub their front wings together to attract females.

- A. True
- B. False

### Katydid Sub-Section

18. Katydid lay their eggs in plants whereas grasshoppers lay theirs in the ground.

- A. True
- B. False

### Katydids—*Scudderia furcata* and *Microcentum retinerve* Identification

19. Katydids resemble grasshoppers but have long antennae. The nymphs are wingless and have black and white banded antennae.

- A. True
- B. False

### Life cycle

20. Katydids produce \_\_\_\_\_ generation(s) a year.

- A. 1
- B. 40-60
- C. 3
- D. None of the above

## Topic 5 – Plant Sucking Insects – Part 1

1. Characteristics of Hemiptera include that most species are \_\_\_\_\_ but some are

- A. Terrestrial – Aquatic
- B. Crawlers – Flyers
- C. Social – Independent
- D. None of the above

### Aphid (*Aphidoidea*) Sub-Section

2. Aphids are members of the superfamily, called?

- A. Orthoptera
- B. Plecoptera
- C. Aphidoidea
- D. None of the above

3. What substance is injected into plants by aphids may cause leaves to pucker or to become severely distorted, even if only a few aphids are present?

- A. Saliva
- B. Honeydew
- C. Pheromone
- D. None of the above

4. Aphids produce large amounts of a sugary liquid waste called?  
A. Saliva                      C. Pheromone  
B. Honeydew                  D. None of the above

#### Summer oils

5. Fatty acid salts or insecticidal soaps are very good against aphids. As with summer oils, they apparently work to disrupt insect cell membranes. They require direct contact with the insects and leave \_\_\_\_\_ residual effect.  
A. No                      C. A good safe amount  
B. Some                  D. None of the above

#### Nervous System Insecticides

6. What chemical product is not effective against many aphids so it is generally not a good choice for control unless recommended specifically?  
A. Malathion,              C. Dursban (chlorpyrifos),  
B. Sevin (carbaryl)      D. None of the above

#### Avocado Thrips (*Scirtothrips perseae*)

7. Adult avocado thrips are \_\_\_\_\_ in color, the abdomens may appear \_\_\_\_\_ because of the chlorophyll extracted from plant material during feeding.  
A. Straw yellow - greenish              C. Grayish black - white  
B. Bordello blue - purplish              D. None of the above

#### Insecticides Most Compatible with IPM

8. What type of insecticides do not leave persistent residues can be effective for greenhouse thrips and other species that feed openly on plants?  
A. Contact                  C. Toxic  
B. Non-contact              D. None of the above

#### Cicada Sub-Section

9. Cicada has \_\_\_\_\_ stages in the Life Cycle  
A. 5                      C. 3  
B. 4                      D. None of the above

10. Geographically speaking, \_\_\_\_\_ can be found throughout the world in many different areas and climates. On the other hand, \_\_\_\_\_ are unique to the central and eastern areas of the United States.  
A. Annual cicadas - periodical cicadas              C. Annual cicadas - Dogday  
B. Periodical cicadas - annual cicadas              D. None of the above

#### Leafhoppers (*Cicadelinae*) Sub-Section

11. Identification: Adult leafhoppers range in size from \_\_\_\_\_ inch long.  
A. 1/8 to 1/4              C. 1/2 - 3/4  
B. 1/4 - 3/8              D. None of the above

12. Leafhoppers have long, distinctive spines along their hind legs and often move sideways, like a \_\_\_\_\_ – something few insects do.  
A. Crab                  C. Ant  
B. Bird                  D. None of the above

13. Which of the following feeds primarily on plants of the rose family, although foliage of other woody plants (blackberry, Cornus, oak, Prunus, Populus, raspberry, Ulmus, Acer and others) serve as food?

- A. Potato leafhopper
- B. Rose leafhopper
- C. Aster or six-spotted leafhopper
- D. None of the above

14. Which of the following feeds on legumaceous plants like alfalfa, as well as on apple, birch, chestnut, maples, and others? Species in the genus, Erythroneura, feed on sycamore leaves, but also on apple, grape and willow.

- A. Potato leafhopper
- B. Rose leafhopper
- C. Aster or six-spotted leafhopper
- D. None of the above

15. Which of the following feeds on vegetables and annual flowers and spreads the aster yellows virus to woody plants like periwinkle and Thunbergia species?

- A. Potato leafhopper
- B. Rose leafhopper
- C. Aster or six-spotted leafhopper
- D. None of the above

### **Planthoppers (Issus) Sub-Section**

16. Which of the following have an enlarged pronotum (shield-like part just behind the head) that extends backward to cover the abdomen; often it is shaped to resemble a thorn or wart on a twig?

- A. Leafhoppers
- B. Treehoppers
- C. Spittlebugs and froghoppers
- D. None of the above

17. Which of the following have 1 or more rows of small spines on the hind tibiae (shin-like segments)? Their bodies tend to be parallel-sided or taper toward the rear.

- A. Leafhoppers
- B. Treehoppers
- C. Spittlebugs and froghoppers
- D. None of the above

18. Which of the following are a lot like leafhoppers but have only 1 or 2 stout spines on the hind tibiae (shin-like segments), plus a small ring of spines at the outer tip of that leg segment? Many species' bodies are widest at the hind end (a little like a resting frog, hence the name froghopper).

- A. Flatid planthoppers
- B. Treehoppers
- C. Spittlebugs and froghoppers
- D. None of the above

19. Which of the following are usually not abundant enough to cause real damage to the health of ornamental plants? Their waxy secretions and the honeydew they excrete disfigure plants and make them sticky to touch.

- A. Flatid planthoppers
- B. Treehoppers
- C. Spittlebugs and froghoppers
- D. None of the above

20. Ecology and Behavior: Planthoppers generally have \_\_\_\_\_ generations per year; however, as many as \_\_\_\_\_ generations per year have been observed in tropical delphacids.

- A. 1 -3, - 12
- B. 2-5, - 50
- C. 2-6, - 21
- D. None of the above

## Topic 6 – Plant Sucking Insects Section –Part 2

### Spider Mites and Predatory Mites Sub-Section

#### Persea Mite Life Cycle

1. Which of the following and immatures are yellowish or greenish with two or more small dark blotches on their abdomen?  
A. Males      C. Both sexes  
B. Females    D. None of the above
2. Persea mite populations are suppressed, and their numbers may decline rapidly, when the daily high temperature is \_\_\_\_\_°F or more on several consecutive days and humidity is low.  
A. 90            C. 100  
B. 80            D. None of the above

#### Types of Avocados Affected

3. Which of the following prefer to feed adjacent to the midrib and large lateral veins and leave behind purplish irregular necrotic spotting.  
A. Six-spotted mite    C. Avocado brown mite  
B. Persea mite        D. None of the above

#### Spittlebugs (Froghoppers) Sub-Section

4. Adult spittlebugs are similar to leafhoppers but are \_\_\_\_\_.  
A. Smaller            C. Green  
B. Fatter              D. None of the above
5. Which of the following are stout and commonly pale green, orange, or yellow?  
A. Nymph spittlebugs    C. Instars  
B. Adult spittlebugs    D. None of the above
6. Spittlebugs commonly have \_\_\_\_\_ generations per year in California.  
A. 3-6            C. 3-4  
B. 1-2            D. None of the above

#### Stink Bugs Sub-Section

7. Stink bug nymphs are not very mobile and remain in the vicinity of the egg cluster through the \_\_\_\_\_ growth stage (for about 2 weeks).  
A. Fourth      C. Second  
B. Third        D. None of the above
8. Small stink bug nymphs may be mostly black are?  
A. Green stink bug    C. Southern green stink bug  
B. Brown stink bug    D. None of the above
9. Small stink bug nymphs that have reddish brown to pale green with black and white stripes on the abdomen are?  
A. Green stink bug    C. Southern green stink bug  
B. Brown stink bug    D. None of the above

10. Small stink bug nymphs that have pale yellow to tan with brown spots are?

- A. Green stink bug
- C. Southern green stink bug
- B. Brown stink bug
- D. None of the above

11. Adults are green/yellow green with red bands on the antennae are?

- A. Green stink bug
- C. Southern green stink bug
- B. Brown stink bug
- D. None of the above

### Squash bugs (*Anasa tristis*)

12. The squash bug spends the \_\_\_\_\_ in the \_\_\_\_\_ stage.

- A. Winter – Adult
- C. Summer - adult
- B. Winter – Nymph
- D. None of the above

### Biology of squash bugs

13. Female squash bugs lay small clusters of eggs (about \_\_\_\_\_) on the undersides of the leaves, especially between the veins where they form a \_\_\_\_\_.

- A. 50 – Circle
- C. 20 – V
- B. 100 – L
- D. None of the above

### Tarnished Plant Bugs (*Lygus lineolaris*)

14. Tarnished plant bugs generally have \_\_\_\_\_ generations depending upon the weather.

- A. 2-4
- C. 3-4
- B. 4-6
- D. None of the above

### Treehoppers

15. Which of the following nymphs are greenish with 12 pairs of hairy spines on the back and a protruding tail-like process at the rear of the abdomen? Hosts of adults and nymphs include various legumes, herbaceous weeds, and certain low-growing plants grown as cover crops.

- A. Oak treehopper
- C. Threecornered alfalfa hopper
- B. Buffalo treehopper
- D. None of the above

### Thrips Sub-Section

16. Thrips Life Cycle: Thrips eggs hatch after \_\_\_\_\_ days, and the nymphs then feed for \_\_\_\_\_ weeks before resting to molt in \_\_\_\_\_ weeks.

- A. 1–2, 1–3, 2–4
- C. 3–5, 1–3, 1–2
- B. 1–3 3–7, 3–4
- D. None of the above

17. Thrips can have up to \_\_\_\_\_ generations per year outdoors.

- A. 15
- C. 25
- B. 10
- D. None of the above

18. Adult thrips live short lives of about \_\_\_\_\_ month(s).

- A. 12
- C. 5
- B. 1
- D. None of the above

19. Avoid foliar sprays of other organophosphate insecticides (e.g., malathion), carbamates (carbaryl\*), or pyrethroids (e.g., bifenthrin, cyfluthrin, fluvalinate, and permethrin). These materials are highly toxic to natural enemies and pollinators, can cause spider mite outbreaks, and are not particularly effective against most thrips.

- A. True
- B. False

### Whiteflies Sub-Section

20. Which of the following is an occasional pest, especially in greenhouses? Adults are about the same size as the silverleaf whitefly (0.9- 1.1 millimeter).

- A. Greenhouse Whitefly
- B. Silverleaf Whitefly
- C. Banded winged Whitefly
- D. None of the above

## Topic 7 – Stinging Insects Section

### Yellowjackets

1. Which of the following build a hard nest out of mud, usually on ceilings, walls or eaves of buildings? The nests are attended by a single female wasp.

- A. Blue Paper Wasp
- B. Mud Daubers
- C. American yellowjacket
- D. None of the above

### Eastern Yellowjacket (*Vespula maculifrons*)

2. Workers are slightly smaller than most yellowjackets, but colony size can number around \_\_\_\_\_ or more individuals.

- A. 500
- B. 50
- C. 5,000
- D. None of the above

### German Yellowjacket (*Vespula germanica*)

3. In Europe, German yellowjacket nests are \_\_\_\_\_, but in North America the vast majority of reported nests are in structures.

- A. Subterranean
- B. Rare
- C. Aerial
- D. None of the above

4. Colonies of this yellowjacket may be active in protected voids into January and February when outside temperatures are not severe.

- A. True
- B. False

### Paper Wasp

5. The paper wasp populations in these nests rarely ever exceed \_\_\_\_\_.

- A. 200
- B. 1,000
- C. 500
- D. None of the above

### Bald Faced hornet

6. A full-sized Bald Faced hornet nest consists not of a single umbrella comb like the \_\_\_\_\_, but four to six wide circular combs -- one hanging below the other and all enclosed with an oval paper envelope consisting of several insulating layers.

- A. Mud Daubers
- B. Paper wasp
- C. German yellowjacket
- D. None of the above

7. Once you have sprayed the area (or areas), make note of the wasp population over the next \_\_\_\_\_ days. A repeat application might be necessary.

- A. 7 -10
- B. 30-45
- C. 10 – 14
- D. None of the above

8. Dust and wettable powder pesticides tend to be more hazardous to bees than solutions or emulsifiable concentrates for contact pesticides. Actual damage to wasp populations is a function of toxicity and exposure of the compound, in combination with the mode of application.  
A. True      B. False

9. A systemic pesticide, which is incorporated into the soil or coated on seeds, may kill soil-dwelling insects, such as grubs or mole crickets as well as other insects, including wasps that are exposed to the leaves, fruits, pollen, and nectar of the treated plants.  
A. True      B. False

### Other Wasps

10. Which of the following females use vacant mud wasp nests. They hunt on the ground, preying mainly on Black Widow spiders? Adults are metallic blue, blue green or bluish black.  
A. Cricket Wasps      C. Digger Wasps  
B. Blue Mud Wasp      D. None of the above

11. Which species harvests crickets from their hiding places and buries them in a simple nest in the ground? These adults are usually slender, metallic bright blue-green or blue with dark violet-tinged wings.  
A. Cricket Wasps      C. Digger Wasps  
B. Blue Mud Wasp      D. None of the above

12. Which of the following wasps have a wide range of prey? They build simple, one cell vertical burrows and will use a rock to cover the entrance. The adults are very slender, have a long thread-waist, a black thorax marked with silver, and a gray or silvery abdomen with an orange or reddish tip.  
A. Cricket Wasps      C. Digger Wasps  
B. Blue Mud Wasp      D. None of the above

13. Which of the following is a common wasp? Females build a mud nest of cells laid side by side usually in a series of two to six, on the sides and eaves of buildings. The adults are mostly black with a yellow waist and legs.  
A. Cricket Wasps      C. Digger Wasps  
B. Mud dauber      D. None of the above

14. Which of the following can usually be found in sandy areas as their name suggests? The females build large tunnels and feed on flies. The adults are stout-bodied; gray or black with pale to bright yellow markings.  
A. Cricket Wasps      C. Digger Wasps  
B. Sand wasp      D. None of the above

15. Umbrella wasps are also commonly referred to as \_\_\_\_\_. These wasps have been named umbrella wasps because their nests are the shape of an inverted umbrella.  
A. Paper wasps      C. Digger Wasps  
B. Blue Mud Wasp      D. None of the above

16. Which of the following usually have small nests and are usually inhabited by about 250 wasps? Unlike many other wasps and yellowjackets.  
A. Cricket Wasps      C. Digger Wasps  
B. Umbrella wasps      D. None of the above

17. Which of the following do not have a worker caste? All female wasps are capable of becoming the queen.
- A. Cricket Wasps      C. Umbrella wasps  
B. Blue Mud Wasp      D. None of the above
18. Which of the following are the fertile female which starts the colony and lays eggs?
- A. Queen      C. New queens  
B. Drones      D. None of the above
19. Which of the following are fertile females, each of which, once fertilized, may start its own nest in the spring?
- A. Workers      C. New queens  
B. Drones      D. None of the above
20. Characteristics of Hemiptera include that the \_\_\_\_\_ ones are beneficial to man
- A. Carnivorous      C. Social – Independent  
B. Predacious      D. None of the above

## Topic 8 - Soil Insects Section

### Billbugs (snout beetles)

1. Heavy infestations of white grubs may kill grass or attract mammals, such as skunks, that damage grass when digging to feed on \_\_\_\_\_.
- A. Roots      C. Grubs  
B. Eggs      D. None of the above

### Carrot Rust Fly (*Chamaepsila rosae*)

2. The carrot rust fly has \_\_\_\_\_ generations per year, with the second generation emerging in July.
- A. 1 to 5      C. 1 to 3  
B. 1 to 4      D. None of the above

### Click Beetles (Wireworms)

3. Biology varies by species. In general, \_\_\_\_\_ overwinter in the ground, becoming active in the spring.
- A. Larvae      C. Adults  
B. Adults and larvae      D. None of the above
4. They pupate in the cells within the soil in late \_\_\_\_\_, and emerge as adults a few weeks thereafter. Generations can greatly overlap.
- A. Spring or summer      C. Fall or winter  
B. Summer or fall      D. None of the above

### Corn Rootworm (4 Primary species)

5. Which rootworm beetles have alternating black and yellow stripes running lengthwise on the wing covers; these black stripes converge to various degrees on the males?
- A. Northern corn      C. Western corn  
B. Southern corn      D. None of the above

### Ground Beetles

6. Ground beetles is about 1/8 - 1/4 inches long (a few can become as large as 1/2 inch in length).

- A. True      B. False

7. Ground beetles are active at day and are never attracted to lights.

- A. True      B. False

### Horsehair worms

8. When horsehair or gordian worms are immature, they are parasites of insects, arthropods and other invertebrate animals.

- A. True      B. False

### May and June beetles (*Phyllophaga* spp., *Polyphylla* spp.)

9. Females, less attracted to lights, tunnel \_\_\_\_\_ inches into the soil and deposit eggs.

- A. 3 to 4      C. 2 to 5  
B. 3 to 6      D. None of the above

10. Adults emerge from pupae in about \_\_\_\_\_ weeks. There is one generation per year, but in some cooler areas, development may take two years.

- A. 3            C. 5  
B. 6            D. None of the above

### Mole crickets

11. The tawny mole cricket is often slightly smaller and less robust than the southern mole cricket.

- A. True      B. False

12. The tawny mole cricket is grayish brown with four pale spots on the pronotum, while the southern mole cricket is often golden brown with a mottled brown pronotum.

- A. True      B. False

### Nematodes

13. Root-feeders are \_\_\_\_\_, and thus are not free-living in the soil.

- A. Plant parasites      C. Predatory nematodes  
B. Bacteria and fungi      D. None of the above

### Scarab beetles

14. Scarab beetles' larvae of most scarab beetles are brownish, S-shaped grubs that live underground or in other protected places.

- A. True      B. False

15. Scarab beetles' heads are often green, and they have four pairs of legs.

- A. True      B. False

### Southwestern masked chafer (*Cyclocephala hirta*)

16. Mated females dig down four to six inches and lay \_\_\_\_\_ eggs. If soil moistures are sufficient, the eggs swell within eight days and hatch in 14 to 18 days at 70 to 75°F.

- A. 11 to 14      C. 5-7  
B. 20 to 25      D. None of the above

### **Sowbugs aka Pillbugs**

17. Sowbugs also have two tail-like appendages which project out from the rear end of the body.

- A. True      B. False

### **Springtails - Collembola**

18. Many springtails are opportunistic species capable of rapid population growth. Under favorable conditions they can reach densities of more than \_\_\_\_\_ individuals per square

- \_\_\_\_\_.
- A. 500- yard      C. 100 – Centimeter  
B. 1,000 – inch      D. None of the above

### **Wood Cockroaches**

19. Wood roach females are longer and thinner than males.

- A. True      B. False

20. Wood roach males are poor fliers. Sometimes females fly into buildings.

- A. True      B. False

## **Topic 9 - Worker Protection Standard Introduction Section**

### **Employers covered by the WPS must:**

1. Reduce overall exposure to pesticides by prohibiting \_\_\_\_\_ from exposing \_\_\_\_\_ during pesticide application.

- A. Owners - Handlers      C. Handlers - Applicators  
B. Handlers- Workers      D. None of the above

2. Inform workers about pesticide hazards by requiring safety training (\_\_\_\_\_), safety posters, access to labeling information, and access to specific information (listing of treated areas on the establishment).

- A. Owners & Handlers      C. Handlers & Applicators  
B. Handlers & Workers      D. None of the above

### **WPS Requirements 2015-2018**

3. First-time ever minimum age requirement: Children under \_\_\_\_\_ are prohibited from handling pesticides.

- A. 16      C. 21  
B. 18      D. None of the above

4. New no-entry application-exclusion zones up to \_\_\_\_\_ feet surrounding pesticide application equipment will protect workers and others from exposure to pesticide overspray.

- A. 100      C. 500  
B. 1,000      D. None of the above

### Training Changes

5. Under the revision, growers subject to the WPS must now train their employees every year and they must be trained on Day 1 before they do any work in the crop areas if it has been less than \_\_\_\_\_ days since the last restricted entry interval expired.
- A. 30                      C. 15  
B. 60                      D. None of the above

### Four Basic WPS Requirements Subsection

#### These regulations contained four basic requirements:

6. Workers are not to be sprayed with pesticides unless necessary.
- A. True                      B. False

### General Duties of WPS

The general duties of the WPS require an agricultural employer or a pesticide handler-employer to:

7. Assure that each worker and handler subject to the standard receives the \_\_\_\_\_.
- A. Provisions of this standard                      C. Labeling of the pesticide  
B. Required protections                              D. None of the above
8. Which of the following prohibit agricultural and handler employers from taking any retaliatory actions against workers attempting to comply with this standard, or from taking any action that prevents or discourages any worker or handler from complying or attempting to comply with the WPS?
- A. The general duties                                      C. Labeling of the pesticide  
B. Required protections                                  D. None of the above

### WPS Protection

9. To ensure that employees will be protected from exposures to pesticides, the WPS requires employers to prohibit handlers from applying a pesticide in a way that will expose \_\_\_\_\_.
- A. Workers or other persons                              C. Monitoring levels  
B. Inadvertent exposures                                  D. None of the above
10. To ensure that employees will be protected from exposures to pesticides, the WPS requires employers to notify workers about \_\_\_\_\_ so they can avoid inadvertent exposures.
- A. Exposures to pesticides                              C. Monitoring  
B. Treated areas    D. None of the above

## Topic 10- PPE, Safety and Health Section

### Personal Protective Equipment (PPE)

1. Which of the following must supply handlers with personal protective equipment (PPE) as required by the pesticide label. All PPE should be stored in an area separate from pesticides?
- A. Applicators                      C. Employers  
B. Handlers                          D. None of the above

2. When the PPE requirement falls under the WPS, the employer has the following responsibilities:

Prevent any \_\_\_\_\_ from wearing or taking home contaminated PPE, unless proper instructions have been given regarding the washing and care of PPE.

- A. Person
- B. Handler
- C. Worker
- D. None of the above

### **§170.240 Personal Protective Equipment**

3. Requirement. Any \_\_\_\_\_ who performs tasks as a pesticide handler shall use the clothing and personal protective equipment specified on the labeling for use of the product.

- A. Handler
- B. Person
- C. Worker
- D. None of the above

### **Definition.**

4. Long-sleeved shirts, short-sleeved shirts, long pants, short pants, shoes, socks, and other items of work clothing are considered personal protective equipment.

- A. True
- B. False

### **Personal Protective Equipment Requirements Citation 28 &33.a.**

5. Any contaminated PPE must be can be washed with any other clothing or laundry. PPE is not considered contaminated with any use around pesticides or in a treated area.

- A. True
- B. False

6. All clean PPE must be either dried thoroughly before being stored or must be put in a well ventilated place to dry.

- A. True
- B. False

### **§170.507 Personal Protective Equipment Rule**

7. The spray applicator must ensure that the personal protective equipment is clean and in proper operating condition.

- A. True
- B. False

8. If used, separable glove liners must be discarded immediately after a total of no more than \_\_\_\_\_ hours of use or within \_\_\_\_\_ hours of when first put on, whichever comes first.

- A. 15 – 48
- B. 8 – 48
- C. 10 -24
- D. None of the above

### **§170.505 Requirements during Applications to Protect Handlers, Workers, and other Persons**

9. Handlers using highly toxic pesticides. The handler employer must ensure that any handler who is performing any handler activity with a pesticide product that has the skull-and-crossbones symbol on the front panel of the pesticide product label is monitored visually or by voice communication at least every \_\_\_\_\_ hours.

- A. 2
- B. 4
- C. 24
- D. None of the above

10. Any worker in an enclosed space production area during a fumigant application maintains telephone contact with another handler stationed immediately outside of the enclosed space.

- A. True
- B. False

## Topic 11 - WPS Required Training Section

### Worker Training 2018

1. The pesticide safety training for workers under the revised WPS (subparts D, E, F and G of 40 CFR Part 170) must be presented orally at a location that is reasonably loud during work.

- A. True                      B. False

2. Workers must be \_\_\_\_\_ years old to perform early-entry activities.

- A. 16                      C. 21  
B. 18                      D. None of the above

### 2018 Handler Training

**Citations. 27-37.**

3. Handlers must be at least \_\_\_\_\_ years old.

- A. 16                      C. 21  
B. 18                      D. None of the above

### Pesticide Safety, Application and Hazard Information

4. The EPA WPS safety poster (or equivalent) where decontamination supplies are located at permanent sites and where decontamination supplies are provided for \_\_\_\_\_ or more workers. 170.311 (a)(5)

- A. 11                      C. 15  
B. 25                      D. None of the above

5. Display the EPA WPS safety poster or equivalent information before an application takes place and for \_\_\_\_\_ days after the REI expires. 170.309 (h)

- A. 10                      C. 30  
B. 15                      D. None of the above

6. Display the SDS and application information within \_\_\_\_\_ hours of the application and before workers enter treated areas. This information must be displayed for \_\_\_\_\_ days after the REI expires and kept in records on the agricultural establishment until \_\_\_\_\_ years after the REI expires. 170.309 (h)&(l) and 170.311 (b)(5)-(6)

- A. 24 – 10 -5                      C. 24 – 30 - 2  
B. 12- 30- 3                      D. None of the above

7. Provide the SDS and application information upon request of a worker, handler, designated representative or medical personnel, within \_\_\_\_\_ days. 170.311 (b)(7)-(9)

- A. 10                      C. 30  
B. 15                      D. None of the above

### Decontamination Supplies

8. Establish accessible decontamination supplies located together within \_\_\_\_\_ mile of all **workers** (when required 170.411 (c)) and **handlers**. 170.411 and 170.509

- A.  $\frac{1}{4}$                       C.  $\frac{1}{2}$   
B. 1                      D. None of the above

9. \_\_\_\_\_ gallon(s) of water per worker and \_\_\_\_\_ gallon(s) of water per handler at the beginning of each work period for routine and emergency decontamination,

- A. 3 – 1                      C. 1 – 5  
B. 1 – 3                      D. None of the above

10. When a product requires protective eyewear for **handlers**, and/or when using a closed system under pressure, provide the following in mixing and loading areas: a system that can deliver gently running water at \_\_\_\_\_ gallons per minute for at least \_\_\_\_\_ minutes or \_\_\_\_\_ gallons of water in containers suitable for providing a gentle eye-flush for about 15 minutes. 170.509 (d)(1)

- A. 10 – 15 – 6
- B. 0.4 – 5 – 1
- C. 0.4 – 15 – 6
- D. None of the above

11. When applying a product that requires protective eyewear, provide \_\_\_\_\_ pint(s) of water per **handler** in portable containers that are immediately available to each handler. 170.509 (d)(2)

- A. 3
- B. 1
- C. 5
- D. None of the above

### Employer Information Exchange

12. Owners/operators of agricultural establishments must make sure any commercial pesticide handler employer they hire is aware of: Specific location and description of any treated areas where an REI is in effect that the commercial handler may be in or walk within \_\_\_\_\_ mile.

- A.  $\frac{1}{4}$
- B. 1
- C.  $\frac{1}{2}$
- D. None of the above

### Emergency Assistance

13. If there is reason to believe a worker or handler has been exposed to pesticides, during or within \_\_\_\_\_ hours of employment, and needs emergency medical treatment, employers must promptly make transportation available to an appropriate emergency medical facility.

- A. 72
- B. 24
- C. 48
- D. None of the above

### Notice About Applications 170.409 (a)

14. If not, post warning signs if the REI is **greater than**: \_\_\_\_\_ hours for outdoor production or \_\_\_\_\_ hours for enclosed space production.

- A. 72 -10
- B. 24 -8
- C. 48 -4
- D. None of the above

### Labeling Information Sub-Section

15. A handler employer must assure that handlers understand all of the labeling requirements related to safe use of pesticides before any handling activity takes place. The handler must also have access to the product labeling information during \_\_\_\_\_.

- A. Handling activities
- B. Product use
- C. Problems
- D. None of the above

### Safe Operation of Equipment

16. A handler employer must assure that handlers are instructed in the safe operation of all equipment they will be using. It is the handler-employer's responsibility to assure that the equipment is working properly and to inform employees, when appropriate, that the equipment may be contaminated with pesticides and to explain the \_\_\_\_\_.

- A. Handling activity
- B. Product use
- C. Correct way to handle such equipment
- D. None of the above

**Personal Protective Equipment**

17. Any person handling a pesticide must use the clothing and PPE specified on the label for \_\_\_\_\_.

- A. Handling activity
- B. Product use
- C. Type of PPE
- D. None of the above

**Decontamination**

18. A \_\_\_\_\_ must provide a decontamination site (as specified in the standard) for washing off pesticides and pesticide residues during any handling activity.

- A. Handler employer
- B. Worker
- C. Owner
- D. None of the above

**Emergency Assistance**

19. A handler employer must provide the same emergency assistance to \_\_\_\_\_ as discussed for workers.

- A. Handlers
- B. Applicators
- C. Owners
- D. None of the above

**§170.309 Agricultural Employer Duties 2015-2018 Rule**

20. Agricultural employers must: Display, maintain, and provide access to pesticide safety information and pesticide application and hazard information in accordance with §170.311 if workers or handlers are on the establishment and within the last \_\_\_\_\_ days a pesticide product has been used or a restricted-entry interval for such pesticide has been in effect on the establishment.

- A. 10
- B. 15
- C. 30
- D. None of the above

**California DPR Requirement**

The Assignment must be submitted to TLC by December 27 in order to be submitted to DPR by the 30th. If it is late, you will be penalized \$50 per day.

## Agricultural Applicator Assignment #5 - Repeat Students

You will have 90 days from the start of this course to have successfully passed this assignment with a score of 80%. You may e mail the answers to TLC, info@tlch2o.com or fax the answers to TLC, (928) 272-0747. This assignment is available to you in a Word Format on TLC's Website. You can find online assistance for this course on the in the Search function on Adobe Acrobat PDF to help find the answers. Once you have paid the course fee, you will be provided complete course support from Student Services (928) 468-0665.

**Write your answers on the Answer Key found in the front of this assignment.**

We will require all students to fax or e-mail a copy of their driver's license with the registration form.

Multiple Choice, Please select one answer and mark it on the answer key. The answer must come from the course text. (s) Means answer can be plural or singular.

Please write down any problem questions.

### Topic 1 - Crop Chewing Insects Section – Part 1

#### Alfalfa Caterpillar (*Colias eurytheme*)

1. The butterflies lay eggs singly on the undersides of leaves. A female can lay \_\_\_\_\_ eggs. The eggs hatch from 3 to 5 days.

- A. 1,000 – 2,000      C. 75-100  
B. 200 to 500      D. None of the above

#### Beet Armyworm (*Spodoptera exigua*)

2. Older caterpillars are green to almost \_\_\_\_\_ with stripes along each side.

- A. Yellow      C. White  
B. Black      D. None of the above

#### Blister Beetles (Insecta: Coleoptera: Meloidae)

3. The striped blister beetle, *Epicauta vittata*, has the typical cylindrical body shape. Beetles are from 1/3 to 2/3 inches long. Their bodies are \_\_\_\_\_ colored with three dark (black) stripes on each wing cover (elytron). The two stripes in the middle of the back continue onto the thorax and often onto the head. The eyes are black or dark grey.

- A. Tan to amber      C. Orange to red  
B. Brown to black      D. None of the above

4. Cantharidin is \_\_\_\_\_ when ingested by horses or other livestock and may cause illness and even death in these animals. It is a very stable compound that retains its toxicity to livestock even when dried remains of beetles, that have been killed in the harvesting process, are fed along with forage.

- A. Somewhat poisonous      C. Highly toxic  
B. Non-toxic      D. None of the above

5. Cantharidin is produced only by \_\_\_\_\_ blister beetles and is stored until mating. Thus, mating status determines whether \_\_\_\_\_ contain the toxin.

- A. Male – Male      C. Males – Females  
B. Female - Male      D. None of the above

**Boil Weevil (*Anthonomus grandis*)**

6. *A. grandis* spends the \_\_\_\_\_ in an adult reproductive dormancy where it subsists without food until it returns to cotton in the early \_\_\_\_\_.

- A. Spring – Winter    C. Summer - Fall
- B. Winter – Spring    D. None of the above

7. The larva feeds for \_\_\_\_\_ days before pupating inside the square or small boll. During the next \_\_\_\_\_ days the pupal stage changes into an adult.

- A. 5 -10, 7 -10                      C. 10- 14, 4 to 6
- B. 7 to 14, 4 to 6                      D. None of the above

**Cabbage Looper (*Trichoplusia ni*)**

8. The mature larva is predominantly \_\_\_\_\_, but is usually marked with a distinct \_\_\_\_\_ stripe on each side.

- A. Green –yellow    C. Green – white
- B. White – green    D. None of the above

**Celery Leaf-tier (*Udea rubigalis*)**

9. Feeding reduces plant vigor. For protection, the larvae tie the tips of leaves together with a silken web, hence their name. It is also known as greenhouse leaf-tier, and can be a serious pest in greenhouses.

- A. True            B. False

**Thresholds**

10. At five different locations in planting inspect 20 plants for larvae on a weekly basis. If more than 4 weeks before harvest and there are \_\_\_\_\_ or more larvae per \_\_\_\_\_ plants, treatment is warranted.

- A. 2 -100                      C. 6 -20
- B. 100 -20                      D. None of the above

**Clover Root Curculio (*Sitona hispidulus* F.)**

11. The clover root curculio life cycle is similar to alfalfa weevil in that the adults leave the alfalfa fields and spend the \_\_\_\_\_ in protected areas.

- A. Winter    C. Spring
- B. Summer    D. None of the above

**Cotton Bollworm (*Helicoverpa armigera*)**

12. Young larvae are difficult to find until they are about \_\_\_\_\_ days old. At this stage, they are about ¼ inch long and brownish colored with some scattered hairs.

- A. 2 to 3    C. 3 to 4
- B. 3 to 6    D. None of the above

13. The full-grown larva is about 1½ inches long with a light-colored head capsule. The predominant body color may range from \_\_\_\_\_ to various shades of tan or dark brown.

- A. Pink or green                      C. Pink to white
- B. Purple or orange                      D. None of the above

### **Cucumber Beetle**

14. Adult striped cucumber beetle has an \_\_\_\_\_ prothorax (the first area behind the head).

- A. Yellowish
- C. Orangish
- B. Reddish
- D. None of the above

### **Cutworms**

15. The larvae are dingy, grayish-black and smooth-skinned and may reach \_\_\_\_\_ inches in length.

- A. 3
- C. 2
- B. 1
- D. None of the above

16. Cutworms are similar in general appearance. They are smooth with very few hairs and are about \_\_\_\_\_ inches when fully grown.

- A. 3
- C. 2
- B. 1
- D. None of the above

### **Earwig (*Forficula auricularia*)**

17. Adults overwinter in the soil. Females lay \_\_\_\_\_ cream-colored eggs in underground nests during January and February, and the newly hatched young (nymphs) first appear in April.

- A. 20-50
- C. 500-1,000
- B. 100-500
- D. None of the above

### **Corn Earworm (CEW) and Tomato Fruit Worm**

18. Adults of most hornworms (including the "tomato" hornworms) fly after dawn and are always observed except occasionally at porch lights.

- A. True
- B. False

### **European Corn Borer (*Ostrinia nubilalis*)**

19. Male moths are pale yellow to light brown in color, with both the forewing and hind wing crossed by dark zigzag lines and bearing pale, often yellowish, patches.

- A. True
- B. False

20. The female is darker in color, usually pale brown or grayish brown, but also with dark zigzag lines and yellowish patches.

- A. True
- B. False

## **Topic 2 - Crop Chewing Insects Section – Post Quiz Part 2**

### **Flea Beetles (Scientific Name: Varies Order: Coleoptera)**

1. In the \_\_\_\_\_, the adults migrate out of their overwintering site as soon as adequate vegetation is available for feeding and egg deposition.

- A. Spring
- C. Summer
- B. Winter
- D. None of the above

**Four-lined Plant Bug (Poecalocapsus linectus)**

2. The adult four-lined plant bug (Poecalocapsus linectus) is a 1/4 inch long, yellowish to yellowish-green True bug with four longitudinal black lines down the wing covers and black antennae. This plant bug looks somewhat like a spotted cucumber beetle.

- A. True      B. False

3. Nymphs feed for about \_\_\_\_\_ days and do most of the damage because they are relatively immobile compared to adults.

- A. 60      C. 45  
B. 30      D. None of the above

**Fruit fly / Drosophila Flies**

4. Various species of Drosophila are known as vinegar or pomace flies. In vineyards more than \_\_\_\_\_% are D. melanogaster and D. simulans.

- A. 50      C. 25  
B. 95      D. None of the above

**Fungus gnats (Orfelia and Bradysia species)**

5. The adults are tiny, flying insects about 1/16 to 1/8 inch long. They look a little like small mosquitoes with gray bodies and long, slender legs. The wings are usually clear. The insects have \_\_\_\_\_ that are larger than their \_\_\_\_\_.

- A. Head - segmented antennae      C. Segmented antennae - Body  
B. Segmented antennae – Head      D. None of the above

6. Species varieties: The commonBradysia species has a wing vein shaped like a "\_\_\_\_\_".

- A. Y      C. C  
B. V      D. None of the above

**Ground Mealybug (Rhizoecus kondonis)**

7. The ground mealybug feeds on alfalfa roots and can cause severe yield losses.

- A. True      B. False

**Hessian Fly (Mayetiola destructor)**

8. Host Plant: Wheat (spring and winter) is the preferred host of the Hessian fly. Barley, oats, triticale and rye are generally considered resistant. Wild grasses such as quackgrass, western wheatgrass, rye grasses are also known hosts.

- A. True      B. False

9. \_\_\_\_\_ will trigger fly emergence in early \_\_\_\_\_. Farmers who plant winter wheat early will have young wheat in the seedling stage when the flies emerge.

- A. Rain – June      C. Wind – September  
B. Rain – September      D. None of the above

10. A single larva, feeding for just \_\_\_\_\_ days, is capable of stunting a young wheat plant or tiller.

- A. 3      C. 5  
B. 7      D. None of the above

### Japanese beetles (*Popillia japonica*)

11. Japanese beetles feed on the leaves, flowers or fruit of more than \_\_\_\_\_ species of plants.

- A. 300
- B. 30
- C. 400
- D. None of the above

12. Japanese beetle grubs look like other white grubs and can only be positively distinguished by examining the pattern of spines and hairs on the underside of the tip of the abdomen.

- A. True
- B. False

### Leaf miners

13. Leafminers overwinter as pupae either in the soil or in infested plant debris. In the \_\_\_\_\_, adult flies emerge and lay eggs on or near susceptible hosts.

- A. Summer
- B. Spring
- C. Fall
- D. None of the above

14. When the eggs hatch, larvae immediately begin to enter the leaf and mine the mesophyll tissue between the upper and lower leaf surfaces.

- A. True
- B. False

### Mexican bean beetle (*Epilachna Varivestis*)

15. Eggs are approximately 1.3 mm in length and 0.6 mm in width, and are pale yellow to orange-yellow in color. They are typically found in clusters of \_\_\_\_\_ on the undersides of bean leaves.

- A. 300 -400
- B. 50 -100
- C. 40 to 75
- D. None of the above

### Pale-Striped Flea Beetle (*Systema blanda*)

16. The pale-striped flea beetle, *Systema blanda*, is a small, 3/16-inch beetle that invades peppers early in the season.

- A. True
- B. False

### Pea Aphid (*Acyrtosiphon pisum*)

17. Prolonged periods of cool temperatures [\_\_\_\_\_] and dry conditions are conducive to the development of pea aphid populations.

- A. 50°F to 60°F
- B. 40°F to 50°F
- C. 60°F to 70°F
- D. None of the above

### Pepper maggot (PM) (*Zonosemata electa*)

18. Maggots reach about ½ inch in length over a period of about \_\_\_\_\_ weeks, and have no distinct head capsule. When they are ready to pupate, they exit at the blossom end, leaving tiny round exit holes. These holes allow for the entry of pathogens into the fruit.

- A. Two
- B. Three
- C. Four
- D. None of the above

### Seedcorn beetles (*Stenolophus lecontei*)

#### Facts on Seedcorn Beetle

19. Two species of seedcorn beetles occur in the field, namely the striped seedcorn beetle and the fat seedcorn beetle.

- A. True
- B. False

### Spider Mites

20. Adult mites have \_\_\_\_\_ legs and an oval body with \_\_\_\_\_ red eyespots near the head end.

- A. 8 – 2      C. 6 -2
- B. 8 – 4      D. None of the above

## Topic 3 - Crop Chewing Insects Section – Post Quiz Part 3

### Stem borers (Rice Destroyers)

1. Gold-fringed stemborer can cause yield loss of about \_\_\_\_\_%.

- A. 20      C. 30
- B. 50      D. None of the above

### Squash vine borer (*Melittia satyriniformis*)

2. The squash borer usually occurs in high numbers although their presence is usually noticed until after damage is done.

- A. True      B. False

### Sweet Potato Weevil (*Cylas formicarius*)

3. A complete life cycle requires one to two months, with \_\_\_\_\_ days being common during the summer months.

- A. 10 and 35      C. 7 to 10
- B. 35 to 40      D. None of the above

4. Adults undergo a period of diapause in the winter. Some stages can be found throughout the year if suitable host material is available.

- A. True      B. False

### Sweetpotato Whitefly - Silverleaf Whitefly (*Bemisia tabaci*)

5. Migrating individuals usually develop on plants that are senescing. These migrations can often be massive and can lead to severe infestation of newly planted crops.

- A. True      B. False

### Threecornered Alfalfa Hopper (*Spissistilus festinus*)

6. The threecornered alfalfa hopper adult is a \_\_\_\_\_, robust, wedge-shaped insect with clear wings. The body is about 0.25 inch (6.4 mm) long, is higher and wider at the head and tapers towards the end.

- A. Brown      C. Bronze
- B. Green      D. None of the above

7. \_\_\_\_\_ are mobile whereas \_\_\_\_\_ cannot fly and are confined to the lower portions of the plant.

- A. Nymphs - Pre-pupa      C. Adults - Pre-pupa
- B. Adults - nymphs      D. None of the above

### Thrips

8. Immatures (called larvae or nymphs) are oblong or slender and elongate and lack wings.

- A. Nymphs      C. Larvae or nymphs
- B. Adults      D. None of the above

**Webworms (*Hyphantria cunea*)**

9. Webs can cover leaves, clusters of leaves or leaves on whole branches, becoming several feet in diameter. They contain many hairy caterpillars that hatched from one egg mass. Some trees can have a high number of webs.

- A. True      B. False

10. Caterpillars grow to about 1 inch long, with black or reddish heads, pale yellow or greenish bodies marked with a broad mottled stripe containing \_\_\_\_\_ (tubercles) down the back (one pair on each body segment) and yellowish patterns on the sides. They are covered with tufts of long whitish hairs.

- A. Two rows of green bumps      C. Two rows of black bumps  
B. Two rows of red bumps      D. None of the above

**Bean Weevil (*Acanthoscelides obtectus*)**

11. Adult weevils are relatively small beetles, 0.13 to 0.2 inch in length, somewhat teardrop or triangular in shape, and dull-colored with white, reddish, or black markings.

- A. True      B. False

12. The cowpea weevil is perhaps the least common of the weevils in California.

- A. True      B. False

**The location of eggs varies depending on the weevil:**

13. Which of the following eggs glued to the bean or the pod?

- A. Cowpea weevil      C. Broad bean weevil  
B. Bean weevil      D. None of the above

**Weevils (*Alfalfa and Egyptian Alfalfa*)**

14. Larvae complete their growth in about \_\_\_\_\_ weeks. They will then spin a cocoon and pupate either in the leaves of the plant or on the ground.

- A. 1 to 2      C. 4 to 6  
B. 3 to 4      D. None of the above

15. Both weevils spend the summer as adults under the loose bark of trees, especially eucalyptus, or in any place they can wedge their bodies, such as in rough-barked trees (walnut) or under shake shingles on homes.

- A. True      B. False

**Western Yellowstriped Armyworm (*Spodoptera Praefica*)**

16. The eggs are \_\_\_\_\_ in color and bear 45–58 small ridges.

- A. Greenish white      C. Greenish to pinkish brown  
B. Golden brown      D. None of the above

17. In shape, the egg is a slightly flattened sphere, measuring 0.46–0.52 mm in diameter and 0.38–0.40 mm in height.

- A. True      B. False

18. Females typically deposit clusters of \_\_\_\_\_ eggs, usually on the underside of leaves. Total fecundity was determined to be over 3000 eggs under laboratory conditions.

- A. 100- 400      C. 500- 1,000  
B. 200–500      D. None of the above

19. The eggs are covered with scales from the body of the adults. Duration of the egg stage is \_\_\_\_\_ days at warm temperatures.

- A. 3-5
- B. 5-7
- C. 7-9
- D. None of the above

20. \_\_\_\_\_ pupate in the soil within a cell containing a thin lining of silk. The reddish brown pupa measures about 18 mm in length.

- A. Nymph
- B. Adult
- C. Larvae
- D. None of the above

## Topic 4 - Hoppers Section

1. \_\_\_\_\_ grasshoppers tend to have more brightly colored colors on their wings to entice the opposite sex.

- A. Male
- B. Both sexes
- C. Female
- D. None of the above

### Locust Verses Grasshoppers

2. Locusts can exist in two different behavioral states which are \_\_\_\_\_ while grasshoppers do not.

- A. Migratory and gregarious
- B. Non-migratory and gregarious
- C. Migratory and non-gregarious
- D. None of the above

3. Grasshoppers have stronger wings than locusts.

- A. True
- B. False

4. Locusts primarily feed upon grasses.

- A. True
- B. False

### Grasshopper Life Cycle

5. Typically, a female grasshopper will lay about \_\_\_\_\_ eggs during the summer and fall.

- A. 700
- B. 40-70
- C. 100
- D. None of the above

6. Extended cool temperatures (less than \_\_\_\_\_°F) and rainy weather during this period can result in severe nymphal mortality due to starvation.

- A. 65
- B. 40
- C. 75
- D. None of the above

7. Grasshopper nymphs go through \_\_\_\_\_ stages or instars.

- A. 3
- B. 4
- C. 5
- D. None of the above

8. Adult grasshoppers, the only stage with wings, can readily move out of hatching areas. Hoppers begin egg laying one to three weeks after reaching the adult stage and may live two to three months, depending on the late summer and early fall weather. All developmental stages are influenced by\_\_\_\_\_.

- A. Weather
- B. Food source
- C. Moisture
- D. None of the above

### **Predator Avoidance**

9. Grasshoppers employ a wide range of mechanisms to keep from being eaten. The foremost of these is \_\_\_\_\_, matching the background in color or texture.

- A. Cryoiosis
- B. Crypsis
- C. Caryopsis
- D. None of the above

### **Locust and Grasshopper Insecticide Control Sub-Section**

10. Several types of insecticides exist that are effective against grasshoppers. These include chemical insecticides as well as specially formulated fungal insecticides that target grasshoppers specifically. Among the more effective solutions are those containing carbaryl, acephate, permethrin and deltamethrin.

- A. True
- B. False

11. \_\_\_\_\_ is the only insecticide among these that is used as bait to control grasshopper populations.

- A. Malathion
- B. Dimilin
- C. Carbaryl
- D. None of the above

### **Cultural Control**

12. Fall tillage is undesirable in most situations because winter cover is essential to protect soil from wind erosion and to conserve moisture.

- A. True
- B. False

13. Baits act too slowly and kill too few grasshoppers to be useful for immediate control. When grasshoppers are at low numbers, handpicking them is an option. However, when at high numbers control becomes very difficult and insecticides are warranted.

- A. True
- B. False

### **Locust Sub-Section**

14. The transition from the solitary phase in locusts is triggered by the secretion of the hormone \_\_\_\_\_ which has been linked to boosting moods in humans.

- A. Malathion
- B. Estrone
- C. Serotonin
- D. None of the above

15. The morphological structure of the locust does not differ from the grasshoppers. They are solitary animals but during \_\_\_\_\_ conditions, they form swarms. While in this form they transform their body shape, color, state of fertility, and behavior.

- A. Favorable
- B. Unfavorable
- C. Warm
- D. None of the above

### **Cricket Sub-Section**

#### **House Crickets (*Acheta domesticus*)**

16. House crickets are known for their loud chirping which is caused when males rub their front wings together to attract females.

- A. True
- B. False

#### **Jerusalem Cricket (*Stenopelmatus fuscus*)**

17. This slow-moving, humpbacked insect is often mistaken for a spider. Six legs and only 2 eyes helps eliminate that as a possibility.

- A. True
- B. False

18. Jerusalem Crickets have enormous, round head brown and a strong jaw is able to deliver a painful bite if mishandled. Their hind legs have 2 rows of spines and seem short for a cricket. They do not have wings, and walk so slowly that most people are comfortable approaching them.

- A. True      B. False

### **Katydids—*Scudderia furcata* and *Microcentum retinerve***

19. Katydids resemble grasshoppers but have long antennae. The nymphs are wingless and have black and white banded antennae.

- A. True      B. False

### **Life cycle**

20. Katydids produce \_\_\_\_\_ generation(s) a year.

- A. 1      C. 3  
B. 40-60      D. None of the above

## **Topic 5 – Plant Sucking Insects – Part 1**

### **Aphid (Aphidoidea) Sub-Section**

1. Aphids produce large amounts of a sugary liquid waste called?

- A. Saliva      C. Pheromone  
B. Honeydew      D. None of the above

2. A fungus called sooty mold can grow on honeydew deposits that accumulate on leaves and branches, turning them black. The appearance of \_\_\_\_\_ on plants may be the first time that an aphid infestation is noticed.

- A. Sooty mold      C. Pheromone  
B. Honeydew      D. None of the above

3. All aphids have \_\_\_\_\_, but some are smaller and less obvious.

- A. Proboscis      C. Cornicles  
B. Spinnerets      D. None of the above

### **Aphid Infestation - Beginnings**

4. The immature aphids or nymphs mature in \_\_\_\_\_ days and then are ready to produce live young.

- A. 7 -10      C. 15 – 30  
B. 3-5      D. None of the above

### **Aphids Sociability**

5. The soldiers of gall-forming aphids also carry out the job of \_\_\_\_\_.

- A. Protecting the clan      C. Mating with the queens  
B. Cleaning the gall      D. None of the above

### **Aphid Control Sub-Section**

6. What is the key to reducing aphid infestations?

- A. Early detection      C. Crushed by hand or removed by pruning  
B. Chemical treatment      D. None of the above

### **Nervous System Insecticides**

7. In fact, applications of \_\_\_\_\_ may reduce the number of beneficial insects, such as lady beetles, and increase the potential for aphid outbreaks.
- A. Malathion,                      C. Dursban (chlorpyrifos),  
B. Sevin (carbaryl)      D. None of the above

### **Insecticide Control of Aphids**

8. One large, heavily infested rose bush may take two applications of \_\_\_\_\_ adult lady beetles each.
- A. 100                      C. 50  
B. 1,500                      D. None of the above

### **Avocado Bud Mites (*Tegolophus perseiflorae*)**

9. A few miticides are registered for use on avocados when fruit is present. \_\_\_\_\_ sprays are recommended.
- A. Sulfur or oil emulsion                      C. Dursban (chlorpyrifos)  
B. Sevin (carbaryl)                      D. None of the above

### **Avocado Thrips (*Scirtothrips perseae*)**

#### **Larvae and Adults**

10. Adult avocado thrips are \_\_\_\_\_ in color, the abdomens may appear \_\_\_\_\_ because of the chlorophyll extracted from plant material during feeding.
- A. Straw yellow - greenish                      C. Grayish black - white  
B. Bordello blue - purplish                      D. None of the above

### **Insecticides Most Compatible with IPM**

11. What type of insecticides do not leave persistent residues can be effective for greenhouse thrips and other species that feed openly on plants?
- A. Contact                      C. Toxic  
B. Non-contact                      D. None of the above

### **Insecticides to Avoid**

12. Acephate can be \_\_\_\_\_ to natural enemies and pollinators and can cause spider mites to become abundant and damage plants after its application.
- A. Highly toxic                      C. Non-toxic  
B. Somewhat toxic                      D. None of the above

13. Avoid foliar sprays of other organophosphate insecticides (e.g., malathion), carbamates (carbaryl\*), or pyrethroids (e.g., bifenthrin, cyfluthrin, fluvalinate, and permethrin). These materials are \_\_\_\_\_ to natural enemies and pollinators, can cause spider mite outbreaks, and are \_\_\_\_\_ effective against most thrips.
- A. Highly toxic - Not particularly                      C. Highly toxic - Always  
B. Non-toxic - Particularly                      D. None of the above

### **Cicada Sub-Section**

14. Cicada has \_\_\_\_\_ stages in the Life Cycle
- A. 5                      C. 3  
B. 4                      D. None of the above

15. Geographically speaking, \_\_\_\_\_ can be found throughout the world in many different areas and climates. On the other hand, \_\_\_\_\_ are unique to the central and eastern areas of the United States.

- A. Annual cicadas - periodical cicadas
- B. Periodical cicadas - annual cicadas
- C. Annual cicadas - Dogday
- D. None of the above

### Leafhoppers (Cicadellinae) Sub-Section

16. Identification: Adult leafhoppers range in size from \_\_\_\_\_ inch long.

- A. 1/8 to 1/4
- B. 1/4 - 3/8
- C. 1/2 - 3/4
- D. None of the above

17. Which of the following feeds primarily on plants of the rose family, although foliage of other woody plants (blackberry, Cornus, oak, Prunus, Populus, raspberry, Ulmus, Acer and others) serve as food?

- A. Potato leafhopper
- B. Rose leafhopper
- C. Aster or six-spotted leafhopper
- D. None of the above

### Symptoms and Diagnosis

18. Which of the following have a lacy pattern on their upper side, they don't jump or run sideways, and they are about half as broad as they are long? Yet another pest that can cause stippling is the spider mite. Check under leaves for the webbing left by spider mites (leafhoppers don't leave webbing).

- A. Leafhoppers
- B. Lacebugs
- C. Grasshoppers
- D. None of the above

### Planthoppers (Issus) Sub-Section

19. Which of the following are a lot like leafhoppers but have only 1 or 2 stout spines on the hind tibiae (shin-like segments), plus a small ring of spines at the outer tip of that leg segment? Many species' bodies are widest at the hind end (a little like a resting frog, hence the name froghopper).

- A. Flatid planthoppers
- B. Treehoppers
- C. Spittlebugs and froghoppers
- D. None of the above

20. Ecology and Behavior: Planthoppers generally have \_\_\_\_\_ generations per year; however, as many as \_\_\_\_\_ generations per year have been observed in tropical delphacids.

- A. 1 - 3 - 12
- B. 2 - 5 - 50
- C. 2 - 6 - 21
- D. None of the above

## Topic 6 – Plant Sucking Insects Section –Part 2

### Spider Mites and Predatory Mites Sub-Section

1. Spider mites and predatory mites are tiny \_\_\_\_\_ legged arthropods (larval stages have \_\_\_\_\_ legs).
- A. 8 - 4                      C. 8 - 6  
B. 6 -6                      D. None of the above

### Persea Mite Life Cycle

2. Persea mite populations are suppressed, and their numbers may decline rapidly, when the daily high temperature is \_\_\_\_\_°F or more on several consecutive days and humidity is low.
- A. 90                      C. 100  
B. 80                      D. None of the above

### Types of Avocados Affected

3. Which of the following populations typically begin building in mid-summer and cause most damage to leaves by late summer? Once defoliation occurs, populations typically decrease due to lack of food.
- A. Six-spotted mites    C. Avocado brown mite  
B. Persea mites        D. None of the above
4. Which of the following feeds on upper leaf surfaces that look “bronzed” by feeding damage?
- A. Six-spotted mites    C. Avocado brown mite  
B. Persea mites        D. None of the above

### Persea Mite Feeding

5. Persea mite damage early in the season can be confused with \_\_\_\_\_ damage.
- A. Six-spotted mites    C. Avocado brown mite  
B. Persea mites        D. None of the above

### Spittlebugs (Froghoppers) Sub-Section

6. Spittlebugs are the immature stage of several insect species known as froghoppers. Though many types of spittlebugs affect gardens, these froghopper nymphs all have one thing in common: the spittle-like \_\_\_\_\_ that conceals and protects them as they feed on plants.
- A. Foam                  C. Spray  
B. Scale                 D. None of the above
7. \_\_\_\_\_ are favorite spittlebug targets.
- A. Cole                    C. Roses, strawberries and herbs  
B. Stone fruit trees    D. None of the above
8. Which of the following have a whorl of many spines at the end of the tibia near the tarsi (feet)?
- A. Grasshoppers        C. Leafhoppers  
B. Spittlebugs           D. None of the above

### Common Spittlebugs

9. Which of the following spittlebugs requires cool, humid or moist conditions so it historically has been common in coastal areas? Its populations have declined in recent years and this is believed due to global warming.

- A. Meadow spittlebug
- B. California spittlebug
- C. Western pine spittlebugs
- D. None of the above

### Stink Bugs Sub-Section

10. Small stink bug nymphs may be mostly black are?

- A. Green stink bug
- B. Brown stink bug
- C. Southern green stink bug
- D. None of the above

11. Small stink bug nymphs that have pale yellow to tan with brown spots are?

- A. Green stink bug
- B. Brown stink bug
- C. Southern green stink bug
- D. None of the above

12. Large nymphs (last two stages) are pale green with pink, black, and white markings are?

- A. Green stink bug
- B. Brown stink bug
- C. Southern green stink bug
- D. None of the above

13. Which of the following looks similar to a predatory stink bug, the spined soldier bug, but has rounded shoulders whereas the soldier bug has sharp, pointed shoulders?

- A. Green stink bug
- B. Brown stink bug
- C. Southern green stink bug
- D. None of the above

### Squash bugs (*Anasa tristis*)

14. The squash bug spends the \_\_\_\_\_ in the \_\_\_\_\_ stage.

- A. Winter – Adult
- B. Winter – Nymph
- C. Summer - adult
- D. None of the above

### Biology of squash bugs

15. Female squash bugs lay small clusters of eggs (about \_\_\_\_\_) on the undersides of the leaves, especially between the veins where they form a \_\_\_\_\_.

- A. 50 – Circle
- B. 100 – L
- C. 20 – V
- D. None of the above

### Tarnished Plant Bugs (*Lygus lineolaris*)

16. Tarnished plant bugs generally have \_\_\_\_\_ generations depending upon the weather.

- A. 2-4
- B. 4-6
- C. 3-4
- D. None of the above

### Treehoppers

17. Which of the following adults and last instars are about 2/5 inch long. Nymphs have prominent spines on the back, which is characteristic of treehopper nymphs? Host plants include ash, elm, fruit trees, hawthorn, locust, poplar, and many herbaceous plants (e.g., tomatoes and peppers).

- A. Oak treehopper
- B. Buffalo treehopper
- C. Threecornered alfalfa hopper
- D. None of the above

### Thrips Sub-Section

18. Thrips Life Cycle: Thrips eggs hatch after \_\_\_\_\_ days, and the nymphs then feed for \_\_\_\_\_ weeks before resting to molt in \_\_\_\_\_ weeks.

- A. 1-2, 1-3, 2-4                      C. 3-5, 1-3, 1-2  
B. 1-3 3-7, 3-4                      D. None of the above

19. Adult thrips live short lives of about \_\_\_\_\_ month(s).

- A. 12                      C. 5  
B. 1                      D. None of the above

### Whiteflies Sub-Section

20. Which of the following wings are held nearly parallel to the leaf and cover the abdomen when at rest? Eggs are occasionally laid in circular patterns on plants with smooth leaves. Eggs are oblong, smooth and are initially yellow but darken before hatching.

- A. Greenhouse Whitefly              C. Banded winged Whitefly  
B. Silverleaf Whitefly              D. None of the above

## Topic 7 – Stinging Insects Section

### Yellowjackets

1. The solitary wasps \_\_\_\_\_ become a problem. Solitary means they do not colonize or form nests where many wasps live together.

- A. Rarely              C. Never  
B. Always              D. None of the above

2. The \_\_\_\_\_ favorite food is a spider meal.

- A. Mud Daubers              C. German yellowjacket  
B. Paper wasp              D. None of the above

### Eastern Yellowjacket (*Vespula maculifrons*)

3. Workers are slightly smaller than most yellowjackets, but colony size can number around \_\_\_\_\_ or more individuals.

- A. 500                      C. 5,000  
B. 50                      D. None of the above

4. The nest of *V. aculifrons* is light tan, made of partially wood and is quite strong.

- A. True                      B. False

### German Yellowjacket (*Vespula germanica*)

5. In Europe, German yellowjacket nests are \_\_\_\_\_, but in North America the vast majority of reported nests are in structures.

- A. Subterranean              C. Aerial  
B. Rare                      D. None of the above

### Paper Wasp

6. The paper wasp populations in these nests rarely ever exceed \_\_\_\_\_.

- A. 200                      C. 500  
B. 1,000                      D. None of the above

### **Bald Faced hornet**

7. A full-sized Bald Faced hornet nest consists not of a single umbrella comb like the \_\_\_\_\_, but four to six wide circular combs -- one hanging below the other and all enclosed with an oval paper envelope consisting of several insulating layers.

- A. Mud Daubers
- C. German yellowjacket
- B. Paper wasp
- D. None of the above

8. Cypermethrin is available only in liquid forms.

- A. True
- B. False

9. Either formulation can be used; Demon EC, Cynoff EC are professional liquid concentrates and Demon WP, Cynoff WP are professional wettable powder concentrates.

- A. True
- B. False

10. Once you have sprayed the area (or areas), make note of the wasp population over the next \_\_\_\_\_ days. A repeat application might be necessary.

- A. 7 -10
- C. 10 – 14
- B. 30-45
- D. None of the above

### **Other Wasps**

11. Which of the following females use vacant mud wasp nests. They hunt on the ground, preying mainly on Black Widow spiders? Adults are metallic blue, blue green or bluish black.

- A. Cricket Wasps
- C. Digger Wasps
- B. Blue Mud Wasp
- D. None of the above

12. Which species harvests crickets from their hiding places and buries them in a simple nest in the ground? These adults are usually slender, metallic bright blue-green or blue with dark violet-tinged wings.

- A. Cricket Wasps
- C. Digger Wasps
- B. Blue Mud Wasp
- D. None of the above

13. Which of the following wasps have a wide range of prey? They build simple, one cell vertical burrows and will use a rock to cover the entrance. The adults are very slender, have a long thread-waist, a black thorax marked with silver, and a gray or silvery abdomen with an orange or reddish tip.

- A. Cricket Wasps
- C. Digger Wasps
- B. Blue Mud Wasp
- D. None of the above

14. Which of the following is a common wasp? Females build a mud nest of cells laid side by side usually in a series of two to six, on the sides and eaves of buildings. The adults are mostly black with a yellow waist and legs.

- A. Cricket Wasps
- C. Digger Wasps
- B. Mud dauber
- D. None of the above

15. Which of the following can usually be found in sandy areas as their name suggests? The females build large tunnels and feed on flies. The adults are stout-bodied; gray or black with pale to bright yellow markings.

- A. Cricket Wasps
- C. Digger Wasps
- B. Sand wasp
- D. None of the above

16. Cicada killers, are the most common species of \_\_\_\_\_.
- A. Cricket Wasps      C. Digger Wasps  
B. Sand wasp          D. None of the above
17. Which of the following are the fertile female which starts the colony and lays eggs?
- A. Queen      C. New queens  
B. Drones      D. None of the above
18. Which of the following are infertile females which do all work except laying eggs?
- A. Workers      C. New queens  
B. Drones      D. None of the above
19. Which of the following are males, which have no stingers, and are born from unfertilized eggs?
- A. Workers      C. New queens  
B. Drones      D. None of the above
20. Which of the following are fertile females, each of which, once fertilized, may start its own nest in the spring?
- A. Workers      C. New queens  
B. Drones      D. None of the above

## Topic 8 -Soil Insects Section

### Billbugs (snout beetles)

1. The hibernating adults become active in late-April to mid-May when the soil surface temperatures rise above \_\_\_\_\_°F.
- A. 70              C. 50  
B. 60              D. None of the above

### Carrot Rust Fly (*Chamaepsila rosae*)

2. When hatched, the larvae feed on the roots for a few weeks, and eventually pupate in the soil for approximately \_\_\_\_\_ days.
- A. 25              C. 60  
B. 45              D. None of the above
3. The carrot rust fly has \_\_\_\_\_ generations per year, with the second generation emerging in July.
- A. 1 to 5          C. 1 to 3  
B. 1 to 4          D. None of the above

### Click Beetles (Wireworms)

4. Biology varies by species. In general, \_\_\_\_\_ overwinter in the ground, becoming active in the spring.
- A. Larvae              C. Adults  
B. Adults and larvae      D. None of the above

5. Eggs hatch within a few weeks and larvae develop through several molts over a period of time from several months to over \_\_\_\_\_ years.

- A. 4
- B. 3
- C. 2
- D. None of the above

#### **Corn Rootworm (4 Primary species)**

6. Which rootworm beetles are pale yellow to tan when they first emerge from the soil but soon darken to light green? They are about ¼ inch long.

- A. Northern corn
- B. Southern corn
- C. Western corn
- D. None of the above

7. Which rootworm beetle (also known as the 12-spotted cucumber beetle) has conspicuous black spots on its wing covers?

- A. Northern corn
- B. Southern corn
- C. Western corn
- D. None of the above

#### **Ground Beetles**

8. Ground beetles is about 1/8 - 1/4 inches long (a few can become as large as 1/2 inch in length).

- A. True
- B. False

#### **Horsehair worms**

9. Horsehair or gordian worms are dangerous to people in all stages of their lives.

- A. True
- B. False

#### **May and June beetles (Phyllophaga spp., Polyphylla spp.)**

10. Females, less attracted to lights, tunnel \_\_\_\_\_ inches into the soil and deposit eggs.

- A. 3 to 4
- B. 3 to 6
- C. 2 to 5
- D. None of the above

11. In \_\_\_\_\_ weeks, small grubs (larvae) hatch from eggs and develop through three stages (instars), with the first two stages lasting about 3 weeks.

- A. 3 to 4
- B. 3 to 6
- C. 2 to 5
- D. None of the above

#### **Mole crickets**

12. The tawny mole cricket is grayish brown with four pale spots on the pronotum, while the southern mole cricket is often golden brown with a mottled brown pronotum.

- A. True
- B. False

#### **Nematodes**

13. Which of the following eat all types of nematodes and protozoa?

- A. Omnivores
- B. Bacteria and fungi
- C. Predatory nematodes
- D. None of the above

14. When nematodes eat bacteria or fungi, ammonium (NH<sub>4</sub><sup>+</sup>) is released because \_\_\_\_\_ contain much more nitrogen than the nematodes require.

- A. Omnivores
- B. Bacteria and fungi
- C. Predatory nematodes
- D. None of the above

**Scarab beetles**

15. Scarab beetles' larvae of most scarab beetles are brownish, S-shaped grubs that live underground or in other protected places.  
A. True      B. False

**Southwestern masked chafer (Cyclocephala hirta)**

16. The pupa takes about \_\_\_\_\_ days to mature.  
A. 6            C. 17  
B. 15          D. None of the above

**Sowbugs aka Pillbugs**

**Recognition**

17. Pillbugs have no posterior appendages and can roll up into a tight ball when disturbed, for which they are sometimes called "roly-polies".  
A. True      B. False

**Springtails - Collembola**

18. Juvenile Collembola grow and undergo \_\_\_\_\_ molts before they become sexually mature.  
A. 1-4          C. 2-5  
B. 3-12        D. None of the above

19. Adult Collembola continue to molt regularly throughout their life (up to \_\_\_\_\_ times during their lifetime) and continue to grow slowly, although not indefinitely.  
A. 50            C. 1,000  
B. 100          D. None of the above

**Wood Cockroaches**

20. Wood roach males are poor fliers. Sometimes females fly into buildings.  
A. True      B. False

**Topic 9 - Worker Protection Standard Introduction Section**

**Four Basic WPS Requirements Subsection**

**These regulations contained four basic requirements:**

1. Workers are not to be sprayed with pesticides unless necessary.  
A. True      B. False

2. Protective clothing is not required for any worker entering a treated area before the specific re-entry period has expired.  
A. True      B. False

**General Duties of WPS**

The general duties of the WPS require an agricultural employer or a pesticide handler-employer to:

3. Assure that each worker and handler subject to the standard receives the \_\_\_\_\_.  
A. Provisions of this standard      C. Labeling of the pesticide  
B. Required protections            D. None of the above

4. Assure that any pesticide subject to the standard is used in a manner consistent with the labeling of the pesticide, including the \_\_\_\_\_.
- A. Provisions of this standard
  - B. Required protections
  - C. Requirements in the standard
  - D. None of the above

**Who is Covered by the 2015 WPS?**

5. Which of the following are those who perform tasks related to growing and harvesting plants on farms or in greenhouses, nurseries, or forests?
- A. Agricultural workers
  - B. Handlers- Workers
  - C. Pesticide handlers
  - D. None of the above

**WPS Protection**

6. To ensure that employees will be protected from exposures to pesticides, the WPS requires employers to exclude workers from areas that remain under a restricted-entry interval (REI), with \_\_\_\_\_.

- A. Narrow exceptions
- B. Depends on situation
- C. Special instructions and duties
- D. None of the above

7. To ensure that employees will be protected from exposures to pesticides, the WPS requires employers to protect early-entry workers who are doing permitted tasks in treated areas during an REI, including \_\_\_\_\_ related to correct use of PPE,

- A. Narrow exceptions
- B. Special situation
- C. Special instructions and duties
- D. None of the above

8. To ensure that employees will be protected from exposures to pesticides, the WPS requires employers to notify workers about \_\_\_\_\_ so they can avoid inadvertent exposures.

- A. Exposures to pesticides
- B. Treated areas
- C. Monitoring
- D. None of the above

9. To ensure that employees will be protected from \_\_\_\_\_, the WPS requires employers to protect handlers during handling tasks, including monitoring while handling highly toxic pesticides, and duties related to correct use of PPE.

- A. Exposures to pesticides
- B. Inadvertent exposures
- C. Monitoring while handling pesticides
- D. None of the above

**Mitigation**

10. Handler means any person, including a self-employed person, who is employed for any type of compensation and who is performing activities relating to the production of agricultural plants on an agricultural establishment.

- A. True
- B. False

## Topic 10- PPE, Safety and Health Section

### Personal Protective Equipment (PPE)

1. When the PPE requirement falls under the WPS, the employer has the following responsibilities:

Prevent any \_\_\_\_\_ from wearing or taking home contaminated PPE, unless proper instructions have been given regarding the washing and care of PPE.

- A. Person
- B. Handler
- C. Worker
- D. None of the above

### §170.240 Personal Protective Equipment

2. Requirement. Any \_\_\_\_\_ who performs tasks as a pesticide handler shall use the clothing and personal protective equipment specified on the labeling for use of the product.

- A. Handler
- B. Person
- C. Worker
- D. None of the above

### §170.507 Personal Protective Equipment Rule

3. If used, separable glove liners must be discarded immediately after a total of no more than \_\_\_\_\_ hours of use or within \_\_\_\_\_ hours of when first put on, whichever comes first.

- A. 15 – 48
- B. 8 – 48
- C. 10 -24
- D. None of the above

### §170.505 Requirements during Applications to Protect Handlers, Workers, and other Persons

4. Handlers using highly toxic pesticides. The handler employer must ensure that any handler who is performing any handler activity with a pesticide product that has the skull-and-crossbones symbol on the front panel of the pesticide product label is monitored visually or by voice communication at least every \_\_\_\_\_ hours.

- A. 2
- B. 4
- C. 24
- D. None of the above

5. Any worker in an enclosed space production area during a fumigant application maintains telephone contact with another handler stationed immediately outside of the enclosed space.

- A. True
- B. False

6. The worker stationed outside the enclosed space has immediate access to and uses the personal protective equipment required by the fumigant labeling for applicators in the event that entry becomes necessary for rescue.

- A. True
- B. False

### Prevention, Recognition, First Aid Treatment of Heat-Related Illness

7. Which of the following is a medical emergency that may result in death? Call 911 immediately.

- A. Heat cramps
- B. Heat stroke
- C. Tired muscles
- D. None of the above

8. Which of the following is the body's response to loss of water and salt from heavy sweating? Signs include headache, nausea, dizziness, weakness, irritability, thirst, and heavy sweating.
- A. Heat cramps      C. Tired muscles  
B. Heat exhaustion    D. None of the above
9. Which of the following is also known as prickly heat, is skin irritation caused by sweat that does not evaporate from the skin?
- A. Heat rash      C. Heat cramps  
B. Tired muscles    D. None of the above
10. Which of the following is the most common problem in hot work environments?
- A. Heat rash      C. Heat cramps  
B. Tired muscles    D. None of the above

## Topic 11 - WPS Required Training Section

### §170.401 Training Requirements for Workers

1. General requirement. Before any worker performs any task in a treated area on an agricultural establishment where within the last \_\_\_\_\_ days a pesticide product has been used or a restricted-entry interval for such pesticide has been in effect, the agricultural employer must ensure that each worker has been trained in accordance with this section within the last \_\_\_\_\_ months.
- A. 60 – 6      C. 30 – 12  
B. 30 – 6      D. None of the above

### §170.405 Entry Restrictions Associated with Pesticide Applications

2. The application exclusion zone is the area that extends \_\_\_\_\_ feet horizontally from the application equipment in all directions during application when the pesticide is applied.
- A. 100      C. 500  
B. 50      D. None of the above
3. The application exclusion zone is the area that extends \_\_\_\_\_ feet horizontally from the application equipment in all directions during application when the pesticide is applied not as in §170.405(a)(1)(i)(A)-(D) and is sprayed from a height of greater than \_\_\_\_\_ inches from the planting medium using a spray quality (droplet spectrum) of medium or larger (volume median diameter of 294 microns or greater).
- A. 50 – 6      C. 25 – 6  
B. 25 – 12    D. None of the above

### Worker Training 2018

4. The pesticide safety training for workers under the revised WPS (subparts D, E, F and G of 40 CFR Part 170) must be presented orally at a location that is reasonably loud during work.
- A. True      B. False
5. The responsibility of agricultural employers to provide workers and handlers with a paycheck and not information and protections designed to reduce work-related pesticide exposures and illnesses.
- A. True      B. False

6. Workers must be \_\_\_\_\_ years old to perform early-entry activities.
- A. 18
  - B. 15
  - C. 21
  - D. None of the above

### **Pesticide Safety, Application and Hazard Information**

7. The EPA WPS safety poster (or equivalent) where decontamination supplies are located at permanent sites and where decontamination supplies are provided for \_\_\_\_\_ or more workers. 170.311 (a)(5)
- A. 11
  - B. 25
  - C. 15
  - D. None of the above

8. Display the EPA WPS safety poster or equivalent information before an application takes place and for \_\_\_\_\_ days after the REI expires. 170.309 (h)
- A. 10
  - B. 15
  - C. 30
  - D. None of the above

9. Display the SDS and application information within \_\_\_\_\_ hours of the application and before workers enter treated areas. This information must be displayed for \_\_\_\_\_ days after the REI expires and kept in records on the agricultural establishment until \_\_\_\_\_ years after the REI expires. 170.309 (h)&(l) and 170.311 (b)(5)-(6)
- A. 24 – 10 -5
  - B. 12- 30- 3
  - C. 24 – 30 - 2
  - D. None of the above

10. Provide the SDS and application information upon request of a worker, handler, designated representative or medical personnel, within \_\_\_\_\_ days. 170.311 (b)(7)-(9)
- A. 10
  - B. 15
  - C. 30
  - D. None of the above

### **Decontamination Supplies**

11. Establish accessible decontamination supplies located together within \_\_\_\_\_ mile of all **workers** (when required 170.411 (c)) and **handlers**. 170.411 and 170.509
- A.  $\frac{1}{4}$
  - B. 1
  - C.  $\frac{1}{2}$
  - D. None of the above

12. \_\_\_\_\_ gallon(s) of water per worker and \_\_\_\_\_ gallon(s) of water per handler at the beginning of each work period for routine and emergency decontamination,
- A. 3 – 1
  - B. 1 – 3
  - C. 1 – 5
  - D. None of the above

13. When a product requires protective eyewear for **handlers**, and/or when using a closed system under pressure, provide the following in mixing and loading areas: a system that can deliver gently running water at \_\_\_\_\_ gallons per minute for at least \_\_\_\_\_ minutes or \_\_\_\_\_ gallons of water in containers suitable for providing a gentle eye-flush for about 15 minutes. 170.509 (d)(1)
- A. 10 – 15 – 6
  - B. 0.4 – 5 – 1
  - C. 0.4 – 15 – 6
  - D. None of the above

14. When applying a product that requires protective eyewear, provide \_\_\_\_\_ pint(s) of water per **handler** in portable containers that are immediately available to each handler. 170.509 (d)(2)

- A. 3
- B. 1
- C. 5
- D. None of the above

### Employer Information Exchange

15. Owners/operators of agricultural establishments must make sure any commercial pesticide handler employer they hire is aware of: Specific location and description of any treated areas where an REI is in effect that the commercial handler may be in or walk within \_\_\_\_\_ mile.

- A.  $\frac{1}{4}$
- B. 1
- C.  $\frac{1}{2}$
- D. None of the above

### Emergency Assistance

16. If there is reason to believe a worker or handler has been exposed to pesticides, during or within \_\_\_\_\_ hours of employment, and needs emergency medical treatment, employers must promptly make transportation available to an appropriate emergency medical facility.

- A. 72
- B. 24
- C. 48
- D. None of the above

### Notice About Applications 170.409 (a)

17. If not, post warning signs if the REI is **greater than**: \_\_\_\_\_ hours for outdoor production or \_\_\_\_\_ hours for enclosed space production.

- A. 72 -10
- B. 24 -8
- C. 48 -4
- D. None of the above

### Application Restrictions and Monitoring 170.505

18. When anyone is handling a highly toxic pesticide with a skull and crossbones, maintain sight or voice contact every \_\_\_\_\_ hours.

- A. 2
- B. 4
- C. 1
- D. None of the above

### Labeling Information Sub-Section

19. A handler employer must assure that handlers understand all of the labeling requirements related to safe use of pesticides before any handling activity takes place. The handler must also have access to the product labeling information during \_\_\_\_\_.

- A. Handling activities
- B. Product use
- C. Problems
- D. None of the above

### Safe Operation of Equipment

20. A handler employer must assure that handlers are instructed in the safe operation of all equipment they will be using. It is the handler-employer's responsibility to assure that the equipment is working properly and to inform employees, when appropriate, that the equipment may be contaminated with pesticides and to explain the \_\_\_\_\_.

- A. Handling activity
- B. Product use
- C. Correct way to handle such equipment
- D. None of the above

**California DPR Requirement**

The Assignment must be submitted to TLC by December 27 in order to be submitted to DPR by the 30th. If it is late, you will be penalized \$50 per day.