

THE UNIVERSITY OF ARIZONA • COOPERATIVE EXTENSION
Yuma County Farm Notes

Cowpea Aphid in Alfalfa

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New Problem

During the past two years, the cowpea aphid, *Aphis craccivora* Koch, has been extremely abundant in alfalfa fields throughout the desert. Commonly referred to as the “Black aphid”, it has been around for many years, usually present on cotton, alfalfa and weeds in low numbers. Furthermore, these recent outbreaks of cowpea aphid in alfalfa are more than a local phenomena. Large populations of cowpea aphids have been reported throughout Arizona. We have heard of similar occurrences from several locations up and down the Colorado river, in central Arizona, and even at the higher altitudes near Wilcox. In addition, outbreaks of cowpea aphid have been reported on alfalfa in the low and high desert growing regions of California, several counties in Texas, and sporadically throughout Kansas and Oklahoma, all within the past year. Infestation levels in these areas were reported to be from 50-125 aphids per stem and there was noticeable yellowing and stunting. Sound familiar? The magic question now is what has caused this benign insect to suddenly become economically important? Unfortunately, no one seems to know. However, we would like to share with you information that might provide some insight into this new situation.

Description

The cowpea aphid is easily distinguished from other aphids (pea [picture](#) and blue [picture](#) alfalfa aphids) in alfalfa largely because it is the only black aphid found infesting the crop. In general, it is a relatively small aphid, less than 2 mm long. Apterous and winged adults are usually shiny black while the smaller nymphs may appear to be a dull gray to black. The first half of the antennae is white, and the legs are usually a creamy white color with blackish tips. An excellent color image of the cowpea aphid can be found on the internet:

<http://www.ipm.ucdavis.edu/PMG/A/I-HO-ACRA-AD.004.html>

Distribution

The cowpea aphid is generally distributed across North America and has been reported in at least 28 states and in three Canadian provinces. This aphid species also has an extensive host range with a marked preference for legumes. In addition to alfalfa, it infests many other crops and weeds including apple, carrot, cotton, cowpea, dandelion, dock, goldenrod, kidney bean, lambsquarters, lettuce, lima bean, pinto bean, peanut, pepperweed, pigweed, red clover, shepherds purse, vetch, wheat, white sweet clover, and yellow sweet clover. You may recall the abundance of cowpea aphid in cotton last April. This species is a close relative to the cotton aphid, *Aphis gossypii* and can commonly be found in seedling cotton terminals. For the first time since I've been in Yuma we observed cowpea aphids colonizing

untreated head lettuce in experimental plots at the Yuma Ag Center.

Unfortunately, little information is available on the biology of the cowpea aphid. The aphid lives throughout the year without producing sexual forms and they are always parthenogenetic viviparous females. Based on our limited observations in alfalfa last year, this aphid has the ability to reproduce very rapidly under our winter and spring growing conditions.

Damage

In alfalfa, these aphids obviously feed on young terminal growth, but can be found infesting leaves, blooms, and stems. In general, legumes can be seriously damaged, either by direct insect feeding or by the transmission of virus diseases. During the winter of 1998/1999, populations of cowpea aphid were common in the low desert stunting alfalfa and in some cases, causing serious injury. In California, damage was especially severe in the high desert where dormant alfalfa varieties are grown. When the alfalfa broke dormancy in the spring, plants failed to grow because of heavy aphid populations. High numbers of cowpea aphids can produce a significant amount of honeydew and sooty mold .

Monitoring and Treatment Guidelines

Because the cowpea aphid has only recently become a problem in alfalfa, no monitoring guidelines or economic thresholds have been developed for this aphid. However, an extension entomologist at Oklahoma State University provided the following information. "Normally, we do not worry much about cowpea aphid, and if temperatures increase, predators will feast heavily on them; however, if damage (yellowing and stunting) is evident, then insecticide treatment may be appropriate." Based on his observations, cowpea aphids damage alfalfa and feed on the plant similar to the pea aphid; therefore, thresholds are likely similar. OSU Cooperative Extension recommends that on alfalfa less than 10 inches tall, 50 aphids/stem should be used as a threshold. On alfalfa taller than 10 inches, 100 aphids/stem may be used. These thresholds have not been verified locally, but may be helpful in making treatment decisions. In any case, several factors, including market conditions should be weighed when deciding on treatment. Based on our experiences from the study below, control measures should be considered when the alfalfa is heavily infested with cowpea aphids and is not growing properly (stunted, yellowing, and sticky with sooty mold).

Control

Very little information is available on insecticide efficacy against cowpea aphids. However, we conducted a small alfalfa trial last winter at the Yuma Mesa Ag Center to evaluate the efficacy of several products against aphids. Small alfalfa plots (20' x 20') were established on 3 Mar, 1999. Plots were arranged in a randomized complete block design with four replications. A single foliar broadcast spray application was made on 4 Mar with a CO² backpack sprayer operated at 40 psi and 20 gpa. A spreader-sticker (Latron CS-7) was added to each treatment at 0.125% v/v. To estimate aphid population abundance sweep samples were taken 1 day prior to treatment and at 3, 7, 14, and 21 days after treatment (DAT). A total of 3, 180-degree sweep samples was taken on each date. We were careful not to

sweep in the same location within in the plot on each sampling date.

Both cowpea aphid and the pea / blue alfalfa aphid complex were present on plants during the study. Pretreatment counts averaged over 250 aphids / sweep for both species. The cowpea aphid population in the untreated plots increased during the 21 day experimental period.

All insecticide treatments provided significant control of cowpea aphid ([Table 1](#)). The pyrethroids (Warrior and Ambush), and Furadan appeared to show better residual activity (> 95 % control) against cowpea aphid than did Dimethoate applied alone (~80% control). A similar trend was observed for control of pea/blue aphid, with the exception that Furadan (~75% control) did not have as much residual activity as the pyrethroids ([Table 2](#)).

The efficacy observed in this trial was not surprising because of the spray coverage. The aphids tended to be aggregated primarily on the young growth and terminals, where a large proportion of the aphid population was directly exposed to the sprays. Furthermore, all treatments except the Dimethoate provided significant control of alfalfa weevils (data not shown). However, the treatment consisting of Steward (indoxacarb; not registered) + Dimethoate provided good control of weevils and aphids.

Following the 21 day period, it was quite obvious that the aphid populations had a significant impact on plant growth and quality. Feeding by cowpea and pea/blue aphids in untreated plots resulted in > 20% reduction in crude protein content of alfalfa plants ([Table 3](#)). Low-moderate numbers present in the Dimethoate treatment did not appear to effect growth or quality. We estimated that feeding on untreated plants by high numbers of aphids resulted in significant stunting of plant growth and yellowing of foliage. In addition, excessive amounts of honeydew and sooty mold were found on the foliage, stems and even on the ground below untreated plants.

Conclusion

Based on our observations during the past year, it is now clear that the cowpea aphid can be considered a pest of alfalfa in the low desert. We have seen that the aphid can build up to large numbers on all stages of alfalfa growth, and under experimental conditions, can significantly reduce alfalfa growth and quality. Fortunately, several insecticides are available that provide effective control.

However, the question still remains: Why has this aphid species suddenly become a significant pest in alfalfa? Perhaps we are only looking at a short-term phenomena. Or maybe we're adding cowpea aphid to the long list of economic pests that already exists in the desert. This would not surprise us considering that in China, the common name for *Aphis craccivora* is "alfalfa aphid". Nonetheless, it will be interesting to see whether this is just an isolated occurrence brought on by recent weather/environmental conditions or if we are dealing with a new alfalfa pest.

Table 1. Efficacy of insecticides against Cowpea Aphid in alfalfa, Yuma Mesa Ag Center, March 1999.

Treatment	Rate/acre	Cowpea Aphids / Sweep			
		3 DAT	7 DAT	14 DAT	21 DAT
Warrior	2.6 oz	3.5 d	4.4 c	2.7 c	3.8
Warrior+Dimethoate	1.6 oz+12 oz	1.3 d	5.9 c	2.5 c	8.0
Ambush+Dimethoate	6.4 oz+12 oz	5.3 d	6.5 c	8.3 c	14.0
Dimethoate 4EC	1 pt	11.0 c	17.8 b	39.2 b	77.8
Furadan 4F	1 pt	2.3 d	2.4 c	3.9 c	3.1
Steward+Dimethoate	6.7 oz+12 oz	18.9 b	22.8 b	58.3 b	45.0
Untreated	—	235.7 a	336.1 a	410.6 a	365.6 a

Table 2. Efficacy of insecticides against Pea/Blue Alfalfa Aphids in alfalfa, Mesa Ag Center, March 1999.

Treatment	Rate/acre	Pea Aphids, Blue Alfalfa Aphids / Sweep			
		3 DAT	7 DAT	14 DAT	21 DAT
Warrior	2.6 oz	0.7 b	0.3 c	3.3 c	2.8 c
Warrior+Dimethoate	1.6 oz+12 oz	2.2 b	1.1 c	6.4 c	10.8 c
Ambush+Dimethoate	6.4 oz+12 oz	1.0 b	1.6 c	5.9 c	13.9 c
Dimethoate 4EC	1 pt	7.1 b	17.0 b	29.8 b	67.5 b
Furadan 4F	1 pt	8.3 b	19.5 b	56.3 b	78.8 b
Steward+Dimethoate	6.7 oz+12 oz	3.7 b	12.8 b	41.8 b	48.5 b
Untreated	—	371.4 a	322.2 a	318.9 a	309.1 a

Table 3. Cumulative impact of cowpea , blue alfalfa, and pea aphids on alfalfa growth and quality.

Treatment	Avg. aphids/sweep	Protein (%)	Observed plant damage
Warrior	6.5	24.31	none
Dimethoate	65.2	24.62	none
Untreated	650.5	18.81	Stunted plant growth, wilted terminal leaves, and excessive honeydew and sooty mold.

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document located at:

<http://cals.arizona.edu/crops/counties/yuma/farmnotes/fn0101cowpea.html>

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