

University of California Cooperative Extension - Siskiyou County

2022 Spring Newsletter

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June, 2022

Newsletter Vol.8

Research Updates

Aphids, Weevils, and Frost

Many growers in Siskiyou County had problems with insects this spring, especially aphids and weevils in alfalfa. While I've discussed aphids, weevils and their control in previous newsletters, I thought it would be valuable to talk about it again due to the combination of insect damage and spring weather in 2022, which caused poor alfalfa and small grains growth this year.

- Aphids

Aphid Damage: Aphids are sap-sucking insects that can turn alfalfa leaves yellow and stunt shoots when in large populations. They also produce honeydew, a sticky substance that turns black if sooty mold fungus is present. While pea aphids are usually not too problematic in alfalfa, their close relative blue alfalfa aphids are. That's because blue alfalfa aphids inject a strong toxin into plants that can delay growth and curl the leaves. Aphid damage is usually seen in patches (Fig. 1) in the fields and once the condition of the host plant decline (Fig. 2), the aphids develop wings and fly to areas of the fields where plants are more vigorous.



Figure 1 (left) shows a field attacked by aphids and the typical infestation pattern; Figure 2 (right) shows stunt alfalfa plants due to blue alfalfa aphid toxin.

Pea aphid vs Blue alfalfa aphid: They are very similar. However, pea aphids (Fig. 3) have narrow dark bands on each antennae segment. On the other hand, blue alfalfa aphid (Fig. 4) antennae gradually darken toward the tips.



Figure 3 (left) shows a pea aphid with narrow dark bands on each antennae segment; Figure 4 (right) shows blue alfalfa aphid and its antennae gradually getting darker towards the tips.

Aphid Control: Once the economic treatment threshold is reached (Table 1), insecticide application may be necessary. When choosing an insecticide, it's recommended to go for most selective products to protect aphids' natural enemies. They will be responsible for keeping aphid population in check and avoid the necessity of a second insecticide application. Feel free to give us a call if you have questions about insecticide options.

Plant height	Pea aphids	Blue alfalfa aphids
Under 10 inches	40 to 50 per stem	10 to 12 per stem
10 to 20 inches	70 to 80 per stem	40 to 50 per stem
Over 20 inches	100 + per stem	40 to 50 per stem

Table 1. Economic thresholds for insecticide application. Number of aphids per stem that makes it worth it to spray considering the price of application and possible yield loss due to aphid damage.

- Weevils

In years when temperature swings (i.e. warm temperatures followed by cold-freezing temperatures) happen often during spring, scouting for weevils can be challenging. Weevil damage can be seen throughout the fields, but the insects themselves are not as obvious. That's because weevil activity is slowed down by the cooler temperatures. Therefore, in addition to using a sweep net for weevil collection, picking up stems and pulling them apart to look for weevils in the plants' growing points is a good way to check how large the weevil population is in a given field. Insecticide application may be needed if weevils are causing a substantial amount of damage and delaying crop growth. Spraying for alfalfa weevil four weeks or more before the first harvest may require a second insecticide application. However, if the thresholds are met, early treatment is often justified to prevent severe defoliation especially at today's high hay prices.



Figure 5 (left) depicts weevil larvae found in the growing points of alfalfa; Figure 6 (right) the typical weevil damage in alfalfa at a later stage of development.

- Frost Damage

As if insect damage was not enough, several frost events this spring caused crop injury and stunting. In May, Scott Valley had 4 nights when temperatures dropped below 25°F (5/1, 5/3, 5/8, and 5/12), which was enough to cause leaf burn and severely stunt new growth in alfalfa and small grains (Fig. 7 & 8). While temperature itself is the main predictor of frost damage, other factors such as the duration of cold exposure, the plant growth stage, and the growing conditions are responsible for the severity of the damage. The weather before the frost is also important. If it's warm during the day and the plants are rapidly growing, frost damage is usually more severe. Additionally, plants stressed by insecticide application or drought are more susceptible to frost injury.

In **wheat**, for example, frost damage causes leaf yellowing and tip burning (Pic 7). At the tillering stage, plants often quickly outgrow the injury and frost at this growth stage has little impact on forage or grain yield. That's because the growing points of the tillers are protected from the cold, close to the soil. Once the weather warms up again, the growth should resume with tillers being produced again. On the other hand, later stages of development frost damage can have a greater impact on yield, especially during the reproductive stages of the crop.



Figure 7 (left) Frost damage in wheat; Figure 8 (right) Frost damage in alfalfa.

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Alfalfa is relatively cold tolerant, and this tolerance is higher in established stands or during seedling stage after the third trifoliolate leaves are already developed (Figure 8). However, there is a period between the first and second trifoliolate leaf stages when alfalfa seedlings are more sensitive to cold temperatures. Avoiding frost damage during crop establishment is the main reason why we should always plant new alfalfa fields by the end of August for fall planting or after mid-May for spring plantings in Siskiyou County. In established fields, the severity of the damage can vary from tip burn to dieback in the top of the canopy. Alfalfa will resume its growth once the temperature warms up but this recovery can often take a week or two after hard frost events like experienced this spring.

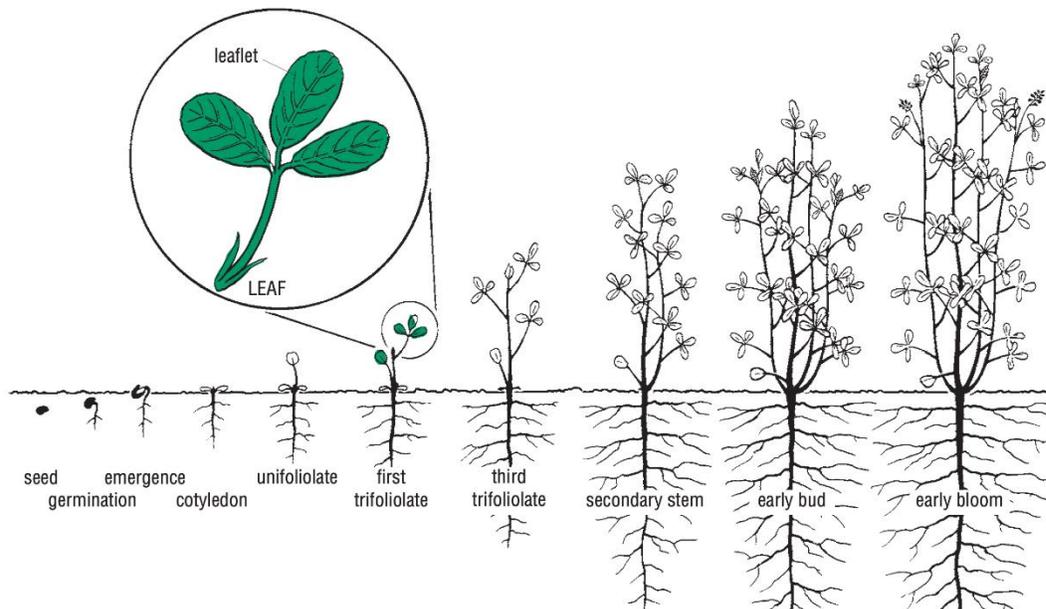


Figure 8: Alfalfa stages of development scheme.

Spring 2022 and the interaction between cold temperatures and insect damage

What happened in the spring of 2022? Alfalfa was stunted from insect damage especially aphids. In Figure 9, the leftmost red circle was a time period when aphids were populating Scott Valley's fields. In this period, we can see that the temperatures in 2022 were higher than in 2021. Higher temperatures in early spring likely increased aphid populations quicker than normal. Alfalfa tends to grow out of the aphid damage once their population are controlled by insecticide applications. However, that was not the case this year. As shown in the rightmost circle on figure 9, a couple of weeks after the aphids infested the alfalfa fields, the temperature dropped in early April. With lower temperature and less sunlight due to cloud coverage, plants were not growing the way they were supposed to. Consequently, alfalfa took longer than usual to grow out of pest damage this year. Once the temperature raised later in the spring, alfalfa growth resumed and the fields looked much better.

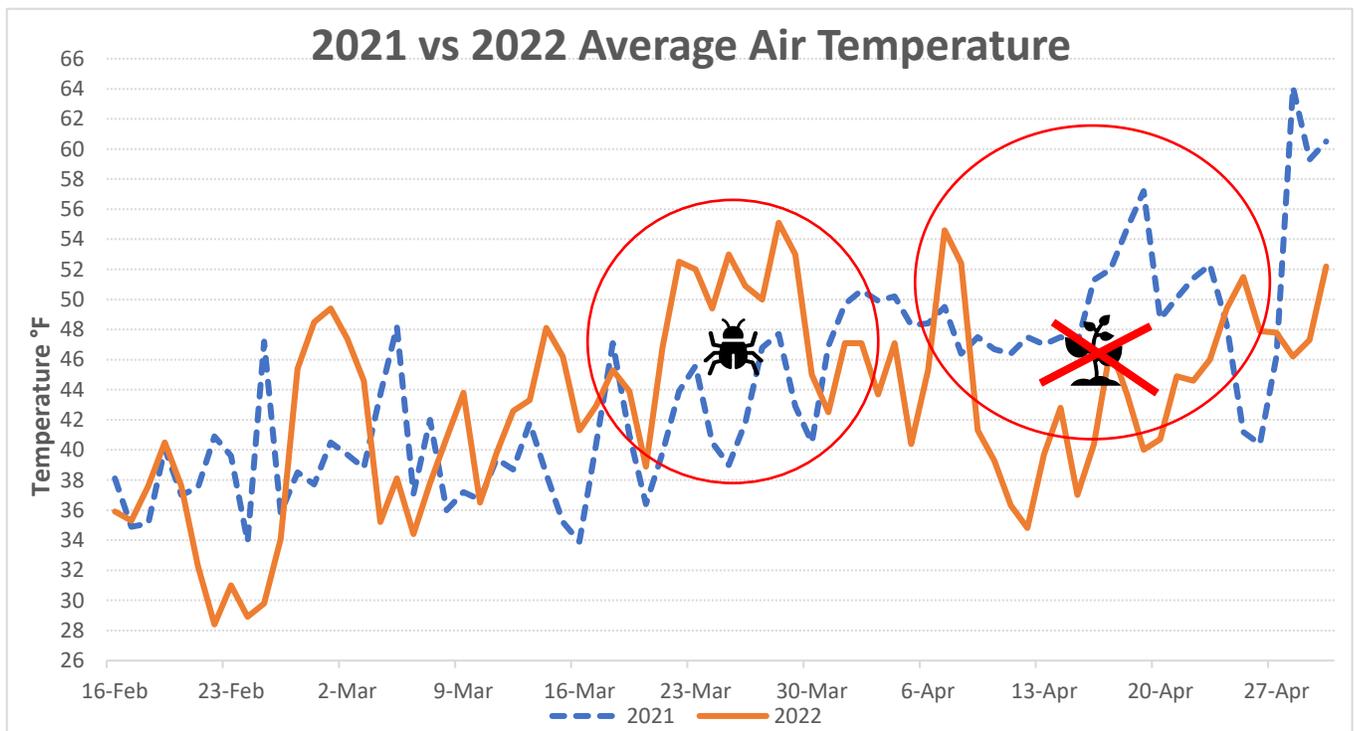


Figure 9: Comparison between 2021 and 2022 average air temperatures.