

## **Progress Towards a Standardized Test for Evaluating Alfalfa for Resistance to Cowpea Aphid (*Aphis craccivora*)**

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Cowpea aphid is the only black aphid that infests alfalfa. Feeding results in stunting, shriveled leaves, honeydew and sticky mold, and even plant death. While cowpea aphid has been found in alfalfa for many years, only in recent years has it become a problem. It is often found in fields in the low valleys of Southern California in the winter, while it is typically a spring and summer aphid in other locations. At present there are no commercially available resistant varieties or a standard test. We have been working for several years to develop resistant varieties as well as to develop data that would support a standard test.

Our greenhouse procedures closely follow the protocol developed for characterizing the resistance of alfalfa to other aphids such as the blue alfalfa aphid. The cowpea aphid has a very broad host range, so numerous legumes would be suitable for supporting a colony. In our experience, the cowpea aphid responds well to a much broader temperature range than suggested for other aphids. In the greenhouse, we have conducted successful tests from 17°C to 32°C. Most field outbreaks we have seen in our area are in the summer with night temperatures typically between 15°C and 22°C and day temperatures typically between 30 and 40 degrees C, although we have seen a few outbreaks at much cooler temperatures. We are confident that the greenhouse results correlate well with field results, since plants that have been selected for resistance in the greenhouse and transplanted to the field have shown good field resistance.

Our data suggests that Ranger would make a good susceptible check. It consistently scores below 2 % resistance. We have tested CUF 101 numerous times, with results varying between 15 and 30 % resistance depending on test severity. We have developed numerous experimental varieties with multiple cycles of selection for resistance, many of which would work as a resistant check. For instance, we have a dormancy 10 line with 55 % resistance when CUF 101 is adjusted to 25 %. We also have a dormancy 5 line that may be more suitable for characterizing dormant varieties which is 35 % resistance when adjusting CUF 101 to 25 %. We expect to work closely with other organizations to verify results before choosing check varieties.