2025 Walnut Preemergent Herbicide Trial – Tehama County, CA

Ryan J Hill, Agronomy and Weed Science Advisor

## Methods:

Experimental treatments were applied to a Tehama County walnut orchard, located in the Loybas Hill region (39.888628, -122.090880). Treatments are listed in Tables 1-5. All treatments are labeled for use in walnut currently except Brake On!. The tank mix treatments used rates at 4 qt/A Prowl, 4 oz/A Revolt (Matrix generic), and 8.6 oz/A Craze. Initial treatments were applied in February, along with a post-emergent mix of 2 qt/A Roundup Powermax 3 and 2 qt/A Rely 280 that was applied to every plot. A subset of treatments were applied in March, one month after the primary set of treatments. These "March" plots also received the same post-emergent treatment in February, along with the other plots.

The trial was arranged as a randomized complete block design, replicated four times, along a single row of walnuts. Each plot was 25 feet long and 10 feet wide, with a single walnut tree in the center. Treatments were applied with a CO2 backpack sprayer calibrated to apply 20 gallons per acre with three Teejet XR8002 nozzles. Application required two passes, one on each side of the tree, with spray swaths slightly overlapping.

Monthly evaluations of weed coverage were made until July, 5 months after the initial treatment.

## Results:

The primary weeds at the time of application were hairy fleabane and white clover. As the trial continued, summer annual broadleaf weeds (primarily prostrate spurge and prostrate knotweed) and summer annual grass weeds (primarily jungle rice and crabgrass) germinated and grew along with perennial yellow nutsedge weeds. **Weed-specific results are discussed in the following pages.**

## Trial Summary and Conclusions

Soil at this location is quite fine and inclined to runoff and erosion, so the grower applied irrigation treatments weekly with short sets, rather than the longer sets and intervals between sets seen in other soil types in Tehama County. This may have affected the fate of residual herbicides in this trial, breaking some down faster and allowing better activity in others.

Mission performed exceptionally well on hairy fleabane and white clover. Craze was also impressive with both weeds, and both Craze and Mission only slightly outperformed Revolt (Matrix generic). For summer annuals both Alion and Brake On! were effective for control of broadleaf and grass weeds while Prowl was consistent controlling summer annual grasses. Yellow nutsedge was controlled by Spartan at 12 fl oz/A and suppressed by Craze at 8.6 oz/A.

Overall, the best treatment in this trial was the Craze/Prowl tank mix. Mission was also impressive but fell short when it came to yellow nutsedge.

**Hairy fleabane (*Erigeron bonariensis*).**

Hairy fleabane largely escaped the post-emergent treatment applied in February, resulting in bad infestations by June (20-29% coverage) in the control plots and plots treated with Prowl or Spartan. Most other plots also had relatively bad fleabane infestations, ranging between 5-20% coverage, with no statistically significant difference from the control plots. Importantly, both Craze and Mission treatments were associated with excellent fleabane control when applied in February. Craze was not quite as effective when applied in March.

**Table 1***: Fleabane coverage is shown following winter-applied pre-emergent herbicide treatments. Bolded rows indicate treatments that had statistically lower weed coverage than the untreated control treatment.*

| | | | | Fleabane coverage (%) | | | |
|---|---|---|---|---|---|---|---|
| February treatments | | March Treatments | | May | | June | |
| Untreated | | | | 18 | ac | 25 | ef |
| Alion | 3.5 fl oz | | | 11 | ac | 15 | bf |
| Goal | 5 pt | | | 4 | ac | 13 | bf |
| Chateau | 6 fl oz | | | 10 | ac | 20 | cf |
| Chateau | 12 fl oz | | | 4 | ac | 5 | bf |
| Prowl | 4 qt | | | 15 | bc | 23 | df |
| Revolt | 4 oz | | | 8 | ac | 9 | bf |
| **Craze** | **5.7 oz** | | | **0** | **ac** | **1** | **ab** |
| **Craze** | **8.6 oz** | | | **1** | **ac** | **3** | **ac** |
| **Mission** | **2.85 oz** | | | **1** | **ac** | **1** | **ab** |
| Spartan | 8 fl oz | | | 7 | ac | 12 | bf |
| Spartan | 12 fl oz | | | 20 | ac | 23 | ae |
| **Craze+Prowl** | | | | **0** | **a** | **1** | **a** |
| **Revolt+Prowl** | | | | **2** | **ac** | **5** | **ad** |
| | | Prowl | 4 qt | 20 | ac | 24 | cf |
| | | Revolt | 4 oz | 1 | ac | 5 | ad |
| | | Craze | 8.6 oz | 2 | ab | 8 | bf |
| | | **Mission** | **2.85 oz** | **0** | **a** | **0** | **a** |
| | | Spartan | 12 fl oz | 22 | c | 29 | f |
| Brake On! | 42 fl oz | | | 8 | ac | 15 | cf |

**White clover (*Trifolium repens*).**

White clover was a well-established perennial with patchy distribution at the time of treatment in February. The post-emergent treatment knocked back the weed, but regrowth was considerable, resulting in 23% coverage in the control plots by June, 4 months after treatment. Also in June, only Mission was statistically separated from the control treatments with a 100% lasting control of white clover at both application timings. March-applied Craze and Matrix at both timings were nearly as effective as Mission. All other treatments were not associated with any statistical separation of means from control treatments. Numerical differences from the control, suggestive of 65-89% suppression, were seen from Chateau, Alion, and both rates of Craze applied in February. The least effective treatments were Goal, Prowl, Brake On!, and Spartan.

**Table 2***: White clover coverage is shown following winter-applied pre-emergent herbicide treatments. Bolded rows indicate treatments that had statistically lower weed coverage than the untreated control treatment.*

| | | | | White clover coverage (%) | | | |
|---|---|---|---|---|---|---|---|
| February treatments | | March Treatments | | May | | June | |
| Untreated | | | | 13 | ad | 23 | bd |
| Alion | 3.5 fl oz | | | 6 | bd | 8 | bd |
| Goal | 5 pt | | | 6 | ad | 10 | bd |
| Chateau | 6 fl oz | | | 4 | ad | 8 | ad |
| Chateau | 12 fl oz | | | 4 | ad | 5 | ac |
| Prowl | 4 qt | | | 17 | d | 17 | bd |
| Revolt | 4 oz | | | 1 | ac | 3 | ab |
| Craze | 5.7 oz | | | 4 | ad | 4 | ad |
| Craze | 8.6 oz | | | 6 | d | 8 | bd |
| **Mission** | **2.85 oz** | | | **0** | **a** | **0** | **a** |
| Spartan | 8 fl oz | | | 7 | ad | 11 | ad |
| Spartan | 12 fl oz | | | 10 | cd | 12 | ad |
| Craze+Prowl | | | | 1 | ab | 5 | ad |
| Revolt+Prowl | | | | 1 | ac | 2 | ab |
| | | Prowl | 4 qt | 11 | ad | 16 | bd |
| | | Revolt | 4 oz | 0 | a | 2 | ab |
| | | Craze | 8.6 oz | 1 | ab | 1 | ab |
| | | **Mission** | **2.85 oz** | **0** | **a** | **0** | **a** |
| | | Spartan | 12 fl oz | 11 | d | 19 | d |
| Brake On! | 42 fl oz | | | 9 | d | 16 | cd |

**Summer annual broadleaf weeds.**

Summer annual weeds started emerging in late May, and many treatments exhibited good control of these weeds through the end of the trial. Summer-germinating broadleaf weeds were exclusively prostrate types, primarily knotweed and spurge, however there was also some prostrate pigweed in these plots. February-applied Craze were among the worst treatments for summer broadleaf control in this trial, with much higher coverage than the untreated control. For these weeds it is difficult to get clear numbers for some treatments due to competition with fleabane and clover. This is especially true of the control, Spartan, and Prowl plots.

The best treatments for summer-annual broadleaf weeds were Alion and Brake on!, with runners-up being February-applied Mission and the Craze/Prowl tank mix. 12 fl oz/A Chateau and March-applied Mission also both had lower average weed coverage than most treatments.

**Table 3***: Summer annual broadleaf weed coverage is shown following winter-applied pre-emergent herbicide treatments. Bolded rows indicate treatments that had statistically lower weed coverage than the untreated control treatment.*

| | | | | Summer annual broadleaf coverage (%) | | | |
|---|---|---|---|---|---|---|---|
| February treatments | | March Treatments | | June | | July | |
| Untreated | | | | 20 | cd | 30 | df |
| **Alion** | **3.5 fl oz** | | | **3** | **ab** | **7** | **ab** |
| Goal | 5 pt | | | 15 | cd | 25 | cf |
| Chateau | 6 fl oz | | | 8 | bd | 16 | bf |
| Chateau | 12 fl oz | | | 1 | a | 10 | ad |
| Prowl | 4 qt | | | 10 | bd | 20 | bf |
| Revolt | 4 oz | | | 4 | ab | 31 | df |
| Craze | 5.7 oz | | | 21 | d | 51 | f |
| Craze | 8.6 oz | | | 20 | bd | 38 | ef |
| **Mission** | **2.85 oz** | | | **2** | **ab** | **20** | **ac** |
| Spartan | 8 fl oz | | | 10 | ad | 33 | ef |
| Spartan | 12 fl oz | | | 25 | cd | 27 | bf |
| **Craze+Prowl** | | | | **4** | **ad** | **23** | **ac** |
| Revolt +Prowl | | | | 1 | a | 21 | ae |
| | | Prowl | 4 qt | 6 | ac | 10 | bf |
| | | Revolt | 4 oz | 10 | bd | 30 | bf |
| | | Craze | 8.6 oz | 19 | d | 23 | cf |
| | | Mission | 2.85 oz | 2 | ab | 9 | ad |
| | | Spartan | 12 fl oz | 26 | d | 40 | ef |
| **Brake On!** | **42 fl oz** | | | **4** | **ad** | **4** | **a** |

**Summer annual grass weeds.**

Summer annual weeds started emerging in late May, and many treatments exhibited good control of these weeds through the end of the trial. Summer-germinating grass weeds were primarily jungle rice and large crabgrass. Again, February-applied Craze were among the worst treatments for summer grass control in this trial, with much higher coverage than the untreated control. For these weeds it is difficult to get clear numbers for some treatments due to competition with fleabane and clover. This is especially true of the control, Spartan, and Prowl plots.

The best treatments for these weeds were all treatments that included Prowl, Alion, and the Brake On! treatment. Of these, only the Revolt/Prowl mix was not statistically separated from the untreated control, but it was still statistically from the Craze treatments.

**Table 4***: Summer annual grass weed coverage is shown following winter-applied pre-emergent herbicide treatments. Bolded rows indicate treatments that had statistically lower weed coverage than the untreated control treatment.*

| | | | | Summer annual grass coverage (%) | | | |
|---|---|---|---|---|---|---|---|
| February treatments | | March Treatments | | June | | July | |
| Untreated | | | | 19 | b | 43 | de |
| **Alion** | **3.5 fl oz** | | | **0** | **a** | **2** | **ab** |
| Goal | 5 pt | | | 4 | a | 23 | de |
| Chateau | 6 fl oz | | | 10 | b | 30 | de |
| Chateau | 12 fl oz | | | 8 | b | 26 | de |
| **Prowl** | **4 qt** | | | **0** | **a** | **0** | **a** |
| Revolt | 4 oz | | | 4 | a | 28 | de |
| Craze | 5.7 oz | | | 23 | b | 66 | e |
| Craze | 8.6 oz | | | 28 | b | 68 | e |
| Mission | 2.85 oz | | | 1 | a | 28 | de |
| Spartan | 8 fl oz | | | 20 | b | 30 | de |
| Spartan | 12 fl oz | | | 18 | b | 40 | de |
| **Craze+Prowl** | | | | **0** | **a** | **4** | **ab** |
| Revolt +Prowl | | | | 0 | a | 6 | bcd |
| | | **Prowl** | **4 qt** | **1** | **a** | **8** | **abc** |
| | | Revolt | 4 oz | 8 | b | 27 | cde |
| | | Craze | 8.6 oz | 24 | b | 48 | de |
| | | Mission | 2.85 oz | 5 | a | 30 | de |
| | | Spartan | 12 fl oz | 13 | b | 28 | de |
| **Brake On!** | **42 fl oz** | | | **4** | **a** | **21** | **ab** |

**Yellow nutsedge (*Cyperus esculentus*)**

Yellow nutsedge coverage was very low in the untreated plots, because of competition with other weeds, however this weed was very aggressive in plots where there was bare ground to exploit. For this reason, notable control was assessed as separation of means from the least effective treatments. In this case February-applied Mission was associated with the worst infestation, averaging 50% coverage. Both application timings of Spartan at 12 fl oz/A, the Craze/Prowl tank mix, and March-applied Craze had statistically lower nutsedge coverage than the Mission reference. February-applied Craze at 8.6 oz/A also saw low nutsedge coverage, though not at a statistically significant level.

**Table 5***: Yellow nutsedge coverage is shown following winter-applied pre-emergent herbicide treatments. Bolded rows indicate treatments that had statistically lower weed coverage than the February-applied Mission treatment. The untreated control was not the reference for this weed because of intense weed competition in those plots.*

| | | | | Nutsedge coverage (%) | | | |
|---|---|---|---|---|---|---|---|
| February treatments | | March Treatments | | June | | July | |
| Untreated | | | | 13 | ab | 13 | ae |
| Alion | 3.5 fl oz | | | 17 | ab | 33 | cf |
| Goal | 5 pt | | | 13 | ab | 33 | ef |
| Chateau | 6 fl oz | | | 11 | ab | 23 | af |
| Chateau | 12 fl oz | | | 16 | b | 30 | af |
| Prowl | 4 qt | | | 17 | ab | 30 | cf |
| Revolt | 4 oz | | | 10 | ab | 25 | af |
| Craze | 5.7 oz | | | 19 | b | 30 | df |
| Craze | 8.6 oz | | | 8 | ab | 13 | bf |
| Mission | 2.85 oz | | | 13 | ab | 50 | f |
| Spartan | 8 fl oz | | | 7 | ab | 10 | af |
| **Spartan** | **12 fl oz** | | | **2** | **a** | **3** | **ad** |
| **Craze+Prowl** | | | | **4** | **ab** | **15** | **ab** |
| Revolt+Prowl | | | | 8 | ab | 25 | df |
| | | Prowl | 4 qt | 10 | ab | 20 | cf |
| | | Revolt | 4 oz | 12 | ab | 30 | cf |
| | | **Craze** | **8.6 oz** | **6** | **ab** | **15** | **a** |
| | | Mission | 2.85 oz | 6 | ab | 24 | df |
| | | **Spartan** | **12 fl oz** | **5** | **ab** | **4** | **ac** |
| Brake On! | 42 fl oz | | | 10 | ab | 20 | af |