Alternative Control Strategies for Cabbage Aphids in Fall Crops

By Susan B. Scheufele
UMass Extension Vegetable Program

Cabbage aphids (CA) can severely reduce yield and marketability of brassica crops throughout the year but can be especially damaging to fall heading crops like cabbage and Brussels sprouts. Growers have identified cabbage aphids as a major priority for research and an area where the currently available management strategies are falling short of production needs. Therefore, we set out to determine 1) the efficacy of alternative insecticides to control aphids and 2) the potential contribution of aphid predators in reducing aphid populations and damage to sensitive crops like Brussels sprouts.

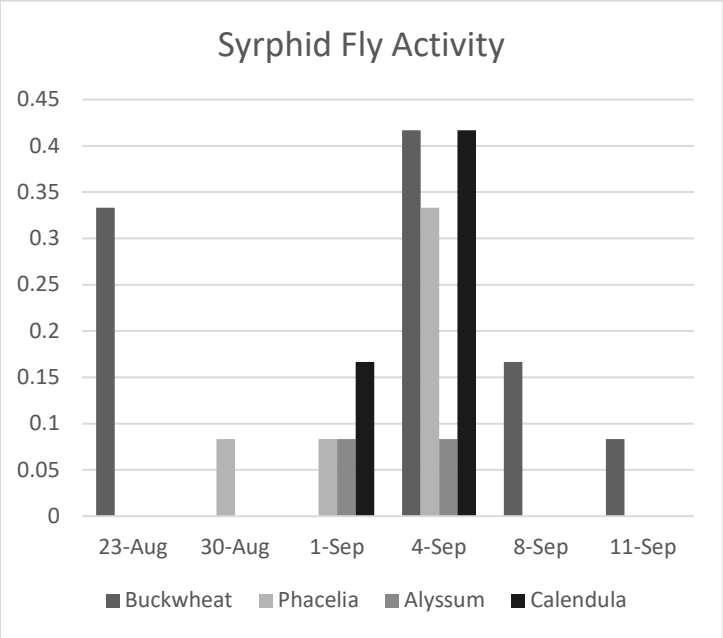
Best Management Practices for Cabbage Aphids—Especially in Brussels Sprouts

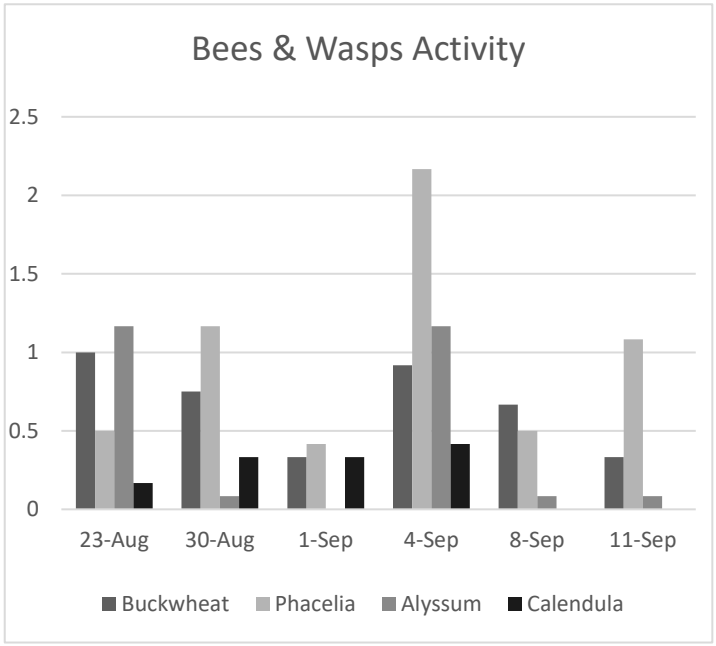
- **Destroy crop residues** promptly after harvest: CA overwinters as eggs on residues. *Spray residues?*
- **Prevent colonization** of crop by planting a grass buffer, living mulch, or white mulch—makes it harder for winged aphids to find the plants
- **Rogue** infested plants out in early season—they really seem to cluster
- **Biocontrol.** Naturally occurring parasitic wasp *Diaeretiella rapae* can achieve high rates of parasitism, lowering # and reproduction rate—preserve by using selective materials for control of caterpillars (Bt), recruit with insectary flowers
- **Scout** early and often: Aphids first observed here June 1 this year
- **Spray regularly** to prevent outbreaks. Treat if >10% of the plants are infested with aphids, especially after heads or sprouts begin to form. Or select 10 leaves at 10 sites for 100 leaves per field, and treat if >20% have aphids. Or follow this sequential sampling procedure to reduce time spent scouting: http://ipm.ucanr.edu/PMG/r108300811.html
    - Conventional: Pyrethroids, organophosphates, Beleaf, Fulfill (selective), Exirel, Neonics…resistance may develop, rotate!
    - Organic / Conventional: Azadiractin, oil, soap, Mycotrol
        - Alternating M-Pede and Azera (+ growing near insectary) → >80% marketable sprouts (UNH, 2016)
        - Mixing oil and soap was more effective than either alone (Gilrein, personal comm)
- **Improve coverage**
- Drop nozzles, directed nozzles, hollow cones, high pressure and volume, ALWAYS use a SPREADER/STICKER when spraying brassicas!
- *Remove lower leaves?*
- Increase spacing or switch to one-row

Experiment 1: Insectary Plants to Attract Aphid Predators and Increase Marketability of Brussels Sprouts, 2017.

In this study our goals were to determine: when and how insectary plants might be most effectively inter-cropped with Brussels sprouts; which species of flower might be most attractive to syrphid flies and parasitic wasps; and to develop protocols for assessing the activity and efficacy of these beneficial insects in reducing aphid populations.

Methods: Brussels sprouts ('Diablo') were seeded on March 20 and transplanted into two border rows with 36" in-row spacing. Five flower species were planted on June 30 in randomized complete blocks (15 sq. ft.) with unplanted buffers between them. Seeds were sown at approximately 5 oz/1000 sq. ft. and thinned to 6" apart. Alyssum seedlings were purchased at a local garden center and transplanted on June 30 to achieve 15-17 clumps/plot. Counted the number of visits by bees and wasps or syrphid flies in an 8-10 sq. in. area for 1-2 minutes, three times per plot. We also collected syrphid fly and wasp samples in order to identify insect species present over time.





Evaluation of Alternative Insecticides to Control Cabbage Aphids in Cabbage, 2017.

Table 1. Reduction in number of aphids after spraying shows relative efficacy of products tested.

	28-Aug	4-Sep	
Product	# Aphids	# Aphids	% Reduction
Untreated	10.7	5.1	52.3
Wrangler	9.8	0.95	90.3
Suffoil-X	6.3	5.5	12.7
M-Pede	8.7	3.75	56.9
Pyganic 5.0	13.3	5.3	60.0
Azatin O	8.1	5.6	31.1
Grandevo WDG	10.1	8.9	12.1
Mycotrol O	7.9	7.8	0.6
PFR97	8.2	10.85	-31.9
Parasitism Rate (%)	12.1	21.7	

Methods: Cabbage ('Capture') was seeded on June 7 and transplanted on July 8 at 18" in-row spacing in rows on 6' centers. Treatment plots were 20' in length and a randomized complete blocks design with 4 replications was used. Once the first aphids were observed, treatments were applied once a mean of ≥ 10 aphids/plant was reached using a pressurized backpack sprayer equipped with on hollow cone nozzle delivering 90 gallons per acre and operating at 60 psi. We counted aphids and mummies weekly and will collect marketable yield as well.

Conclusions: Of the OMRI-approved insecticides tested the insecticidal soap M-Pede and the azadiractin-based product Azatin O significantly reduced the number of cabbage aphids per plant on three dates while other products did not significantly reduce CA numbers (see Figures 1 and 2 next page).

Mixtures or rotations of these two products may be even more effective than either one used alone.

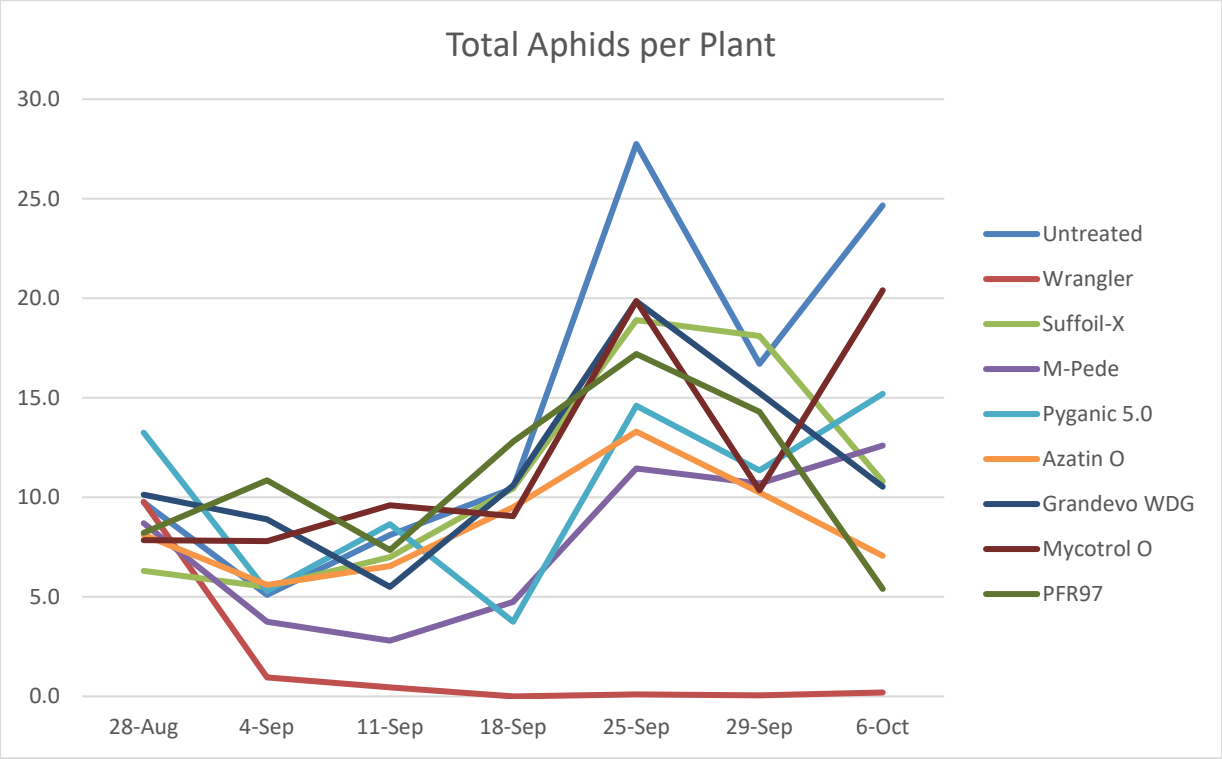


Figure 1. The OMRI-approved insecticides tested were not as effective as the conventional control but some of them did show significant reductions in CA number towards the end of the season.

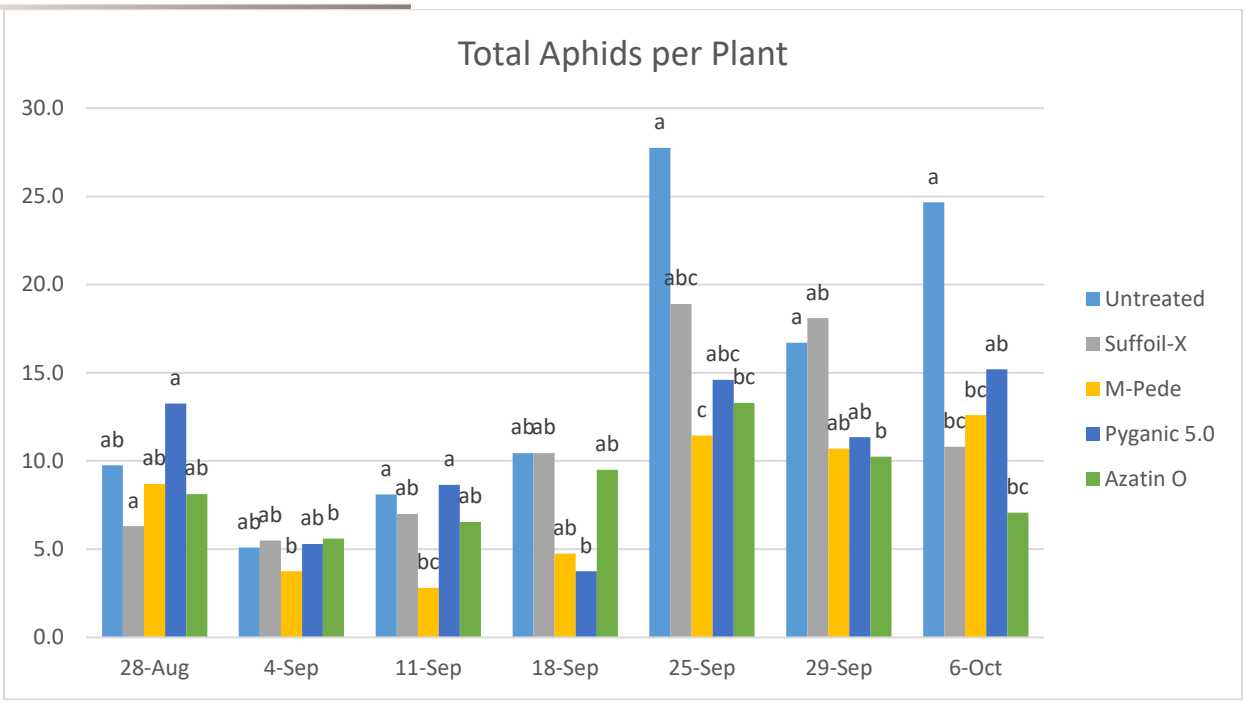


Figure 2. Above are some of the more effective products tested. Bars that share a letter are not significantly different from each other.