NOVEL INSECTICIDES SUPPORT CONSERVATION BIOLOGICAL CONTROL IN COTTON

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Abstract

Arizona has a successful integrated pest management plan (IPM) for arthropod pests of cotton including two key pests, *Bemisia argentifolii* (=*B. tabaci* MEAM1) and *Lygus hesperus*. Central to this plan is conservation of natural enemies through threshold-based use of effective and selective insecticides. As a result of the IPM plan, natural enemies have become a significant factor in suppressing whitefly populations below economic levels. Field studies were designed to test the selectivity of recently introduced insecticides cyantraniliprole (Exirel® 0.83SE), flupyradifurone (Sivanto™ 200SL), pyrifluquinazon (PQZ™ 1.87SC) and sulfoxaflor (Transform® 50WG). Sulfoxaflor is an insecticide used for *L. hesperus* control with suppressive effects on *B. argentifolii*, and the other insecticides are used for *B. argentifolii* control. The selectivity of these insecticides was measured on the cotton arthropod community (27 taxa measured), which includes key generalist predator taxa in Arizona cotton: *Collops* spp., *Orius tristicolor*, *Geocoris* spp., *Misumenops celer*, *Drapetis* nr. *divergens* and *Chrysoperla carnea s.l.* A novel approach that makes use of predator to prey ratios, indicators of biological control in cotton, was used to more accurately determine insecticide selectivity along with other analyses. These insecticides were found to selectively conserve the overall arthropod predator community and enable predator to prey ratios favorable to biological control. These insecticides represent new options compatible with sustainable pest management that support biological control in the Arizona cotton system.

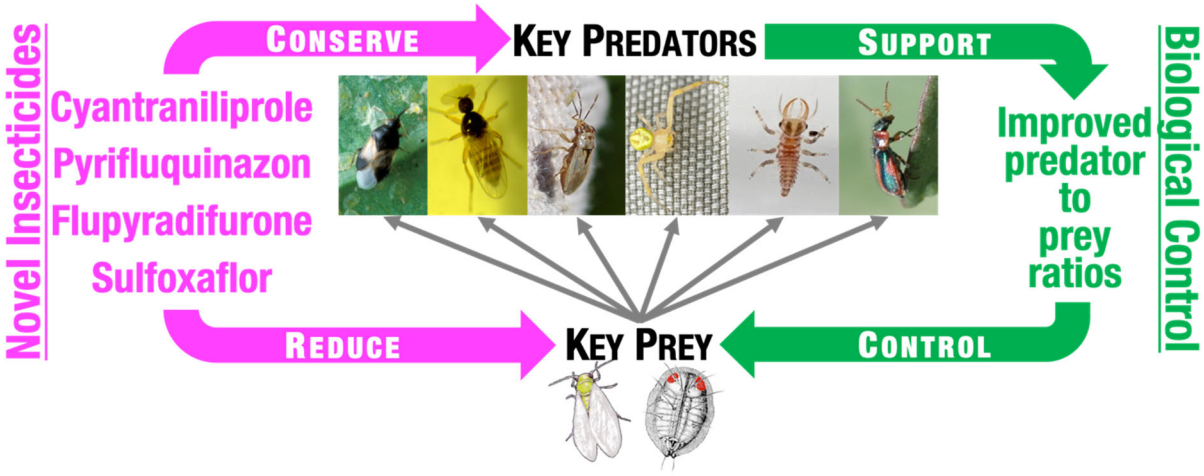

Figure 1. Exirel, PQZ, Sivanto and Transform significantly reduce key prey density, while conserving the arthropod community and key predators. Because key predators (Vandervoet et al. 2018) are conserved by these insecticides, improved predator to whitefly ratios are supported. As a result, improved predator to whitefly ratios promote significant biological control of whiteflies (Bordini et al., 2021).

References

Bordini, IC, Ellsworth, PC, Naranjo, SE & Fournier, AJ. 2021. Novel insecticides and Generalist Predators Support Conservation Biological Control in Cotton. Biological Control, Vol. 154. https://doi.org/10.1016/j.biocontrol.2020.104502

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