

IMPROVING PREDICTABILITY IN NON-TARGET RISK ASSESSMENT: CAN WE CHARACTERIZE SELECTION PRESSURES THAT LEAD TO PARASITOID HOST SHIFTS?

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ABSTRACT. The braconid parasitoid *Diachasmimorpha tryoni* (Cameron) was imported to Hawaii early in the 20th century to control the medfly, *Ceratitis capitata* (Wiedemann). The parasitoid became established on all major islands, and high levels of parasitism were recorded. Subsequent invasion of the islands by Oriental fruit fly (*Dacus dorsalis* Hendel) competitively displaced medfly from most low-elevation sites. Also, imported parasitoids of Oriental fruit fly were superior intrinsic competitors of *D. tryoni* within medfly larvae. Thus, physiologically suitable target hosts of *D. tryoni* became much less abundant.

The tephritid *Eutreta xanthochaeta* Aldrich (lantana gall fly) was introduced to Hawaii for biological control of the weed *Lantana camara* L. Host acceptance and host suitability tests showed the gall fly to be susceptible to parasitism by *D. tryoni*. In recent years, it has become increasingly difficult to find *D. tryoni* in field-collected medflies, while parasitism rates of up to 28% have been recorded in the non-target flies.

Lantana gall flies are larger than medflies. *Diachasmimorpha tryoni* reared from gall fly larvae are thus larger, more fecund, and have a more female-biased sex ratio than those reared from medfly. Lantana provides a relatively “competitor-free space” for *D. tryoni* growth and development. Reduced competition from other parasitoids, and the greater availability of larval nutrients may be favoring a host shift of *D. tryoni* from medfly to the non-target species. The consequences of this shift for both insect and weed biological control are discussed.