

A MODIFIED NEW WHITEFLY TRAP (CC TRAP) TO INCREASE WHITEFLY ADULT CATCHES

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Abstract

Silverleaf whitefly monitoring to verify occurrence and assess population densities is an integral part of determining need for application of control strategies. We have developed a trap that attracts and catches whitefly adults. The numbers caught reflect seasonal change of adult activity and differences in population density. We are in the process of refining and improving the prototype trap. Several modifications have been made that have significantly improved trap efficiency.

Introduction

The yellow sticky card trap has been widely used for monitoring whitefly adult activities in crop production. It has also been used for detection and to survey seasonal whitefly adult population changes. Sticky traps are not reusable. They are difficult to handle because of sticky material and have some other disadvantages (Chu et al. 1996). We developed and evaluated a new reusable prototype whitefly trap (CC trap) that attracted and caught whitefly adults and the catches reflected adult density changes in cotton fields at Brawley, CA and in a cantaloupe field in Maricopa, AZ in 1995. However, numbers of adults caught in cotton fields were low compared to the catches with yellow sticky card traps. The purpose of the paper is an update on modifications of the CC trap to improve efficiency and potential usefulness of the trap in whitefly sampling.

Modification of the CC Trap

The prototype CC whitefly trap consisted of an inverted 350 ml crystal clear plastic drinking cup fitted with a 70 cm² yellow plastic coated paper base. The yellow upright cone shaped base had a 10.5 cm diameter open bottom and 3.8 cm diameter open top, serving as an entrance hole. The ratio of the two openings is 2.8. Whitefly adults are attracted to yellow (Mound 1962) and fly to the yellow base of the trap. Our observations were that when they landed on the outside surface of trap base, they walked to the shaded inner surface for resting (Chu et al. 1995). When leaving the inner trap base surface, if they were near the edge of the open top, they generally flew straight upward into the cup. If they were close to the bottom trap opening, however, they appear to often fly out of trap avoiding capture.

We hypothesized that by changing the trap base contour, the trap would catch more adults. We modified the trap base in the shape of a cylinder with inside cone sides more vertically oriented. The new trap base has a 7.1 cm diameter open bottom and 4.7 cm diameter open top. The ratio of the two openings is 1.5 in comparison to 2.8 of the prototype. The prototype trap and the trap with the modified trap base were compared in whitefly infested kenaf plots on 5 and 11 September 1996. The results show an increase in numbers of whitefly adults caught in the trap with the modified base as compared to the prototype trap base (Table 1).

The diameter of the trap base top opening of the modified CC trap is about 1 cm wider than the opening of the prototype trap. Possibly more adults may enter the trap but the enlarged opening may also allow increased numbers to leave the trap. To retain more of the adults that enter the modified CC trap, we designed a wire mesh cone, 3.5 cm long that fitted on base top opening and inside the trap top. The wire mesh openings are about 2.0 x 1.5 mm. Whitefly adult trap catch comparisons between the modified trap base and the modified trap base plus the wire mesh cone showed that the wire mesh modification increased adult catches by two and a half fold as compared to the traps without a wire mesh cone (Table 1).

Discussion

The CC trap, because it is reusable and easy to use, has the potential to replace yellow sticky card traps for survey and monitoring of whiteflies. The CC trap can hold over 40,000 adults without overloading and can be exposed for long sampling periods as compared to sticky traps. Adult catches are easily counted without aid of a microscope, as compared to difficult counting of whiteflies on sticky traps. The design of the CC trap is based on whitefly adult behavior. It represents a new concept in insect trapping device design. Use of the CC trap needs to be explored as a sampling tool.

References Cited

- Chu, C.C., T. J. Henneberry, and A. C. Cohen. 1995. *Bemisia argentifolii* (Homoptera: Aleyrodidae): host preference and factors affecting oviposition and feeding site preference. *Environ. Entomol.* 24: 354-360.
- Chu, C.C., T. J. Henneberry, and A. C. Cohen. 1996. Development and evaluation of a *Bemisia argentifolii* trap for survey and monitoring adult population density, pp. 1029-1301. In P. Dugger and D. A. Richter (eds.) *Proc. Beltwide Cotton Conf., National Cotton Council, Memphis, TN.*
- Mound, L.A. 1962. Studies on the olfaction and colour sensitivity of *Bemisia tabaci* (Genn.) (Homoptera: Aleyrodidae). *Ent. Exp. Appl.* 5: 99-104.

Table 1. Mean numbers silverleaf whiteflies caught^a in the prototype CC trap and the modified CC trap in a cotton field at Brawley, CA.

Trap type	Exp. 1	Exp. 2
	No. adults/trap/4 h	No. adults/trap/24 h
Prototype	32.8 ^b	
Modified	42.1	187
Modified plus wire mesh cone		461

^a 5 and 11 September 1996.

^b Means in a column are significantly different by F test, $p < 0.05$.