N O T E

Influence of Trap Color on Collection of the Recently-Introduced Bean Plataspid, *Megacopta cribraria* (Hemiptera: Plataspidae)[1]

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Large numbers of the exotic bean plataspid, *Megacopta cribraria* (F.) (Hemiptera: Plataspidae), were first collected from several northeast Georgia counties beginning in October 2009 (Suiter and Ames 2009, Statewide Pest Alert). How this insect arrived in the United States and where it came from is still not known. The native range of *M. cribraria* is reported to be throughout Asia and the Indian Subcontinent (Hosokawa et al. 2007, Proc. R. Soc. B. 274: 1979 - 1984; Srinivasaperumal et al. 1992, Proc. Indian Natn. Sci. Acad. 6: 333 - 340; Hua 2000, List of Chinese Insects. Vol. 1, Zhong-shan Univ. Press, Guangzhou. 251 pp.). It is similar to other Plataspidae in having a somewhat unusual symbiotic relationship with its gut bacteria. Before laying eggs, females deposit particles containing the symbiont which are then eaten by newly-hatched nymphs under natural conditions. Nymphs experimentally deprived of access to the symbiont exhibited slower growth, smaller body sizes, and higher mortality. Thus, presence of the obligate symbiont was predictive of the insect's status as a pest (Hosokawa et al. 2007). Preliminary testing of *M. cribraria* in Georgia showed that all individuals evaluated contained the symbiont (Jenkins et al. 2010, J. Entomol. Sci. 45: 62 - 63).

The plant hosts of the Plataspidae are predominantly legumes (i.e., bean family) (Schaefer and Panizzi 2000, Heteroptera of Economic Importance. CRC Press, Boca Raton, FL. 828 pp.), such as kudzu (*Pueraria montana* (Lour.) Merr.), lablab bean (*Lablab purpureus* L.), and soybeans (*Glycine max* (L.) Merr.). Although the occurrence of a new insect feeding on kudzu was welcomed in Georgia, the possibility of an insect damaging any portion of the $12.5 billion U.S. soybean crop is not. Reports from China suggest *M. cribraria* can cause serious damage to soybean production (Zhixing et al. 1996, Plant Protect. 3: 7 - 9; Guangnan et al. 2006, Acta Agro. Sinica. 32: 491 - 496.). In addition to soybeans, other legume crops have been negatively affected by this pest such as *lablab* beans (Thippeswamy and Rajagopal 1998, Karnataka J. Ag. Sci. 11: 941 - 946) and *Phaseolus* beans (Easton and Pun 1997, Proc. Entomol. Soc. Wash. 99: 574 - 582). Furthermore, many important forest plant species in the bean family (i.e., redbud, black locust) can be found in the southeastern U.S., and how they might be impacted by this pest remains unknown.

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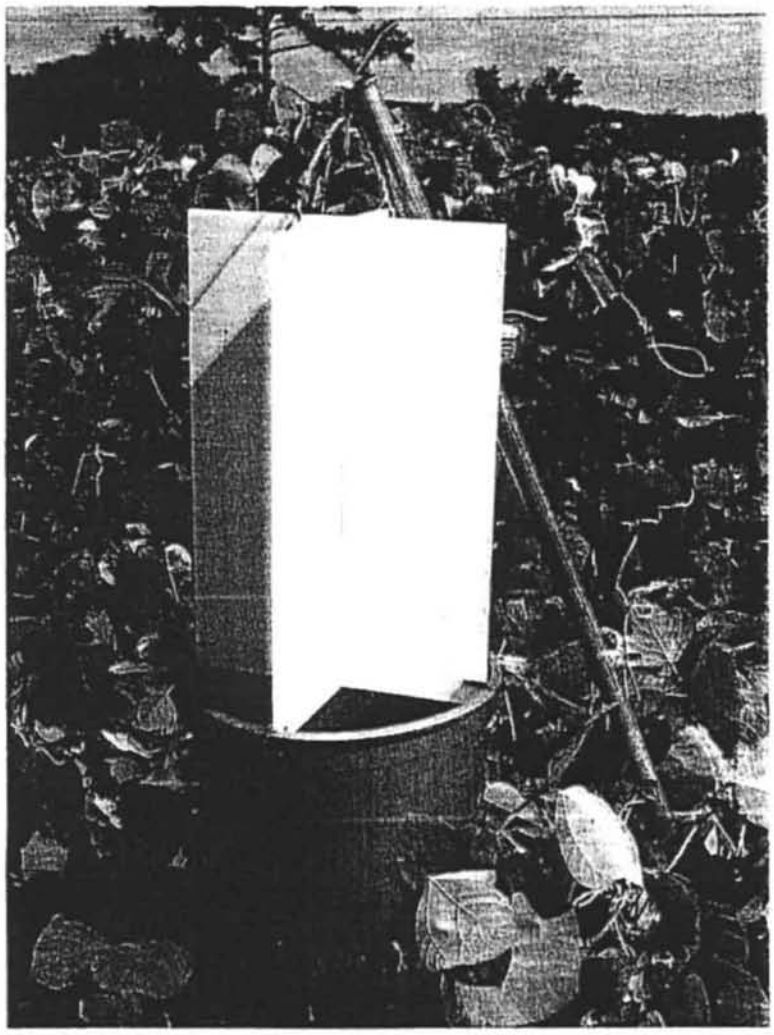

Fig. 1. Cross-vane trap used to collect adult *M. cribraria*.

Establishing baseline information on abundance and seasonal activity is an important first step in evaluating and studying a new insect in a novel environment. Because *M. cribraria* (and the family Plataspidae) is new to North America, no studies exist on how to best collect and monitor the species. The effect of trap color on collection performance has been studied extensively for many groups of insects such as lepidopterans (Roubos and Liburd 2008, J. Agric. Urban Entomol. 25: 99 - 109), coleopterans (Al-Saoud et al. 2010, J. Entomol. 7: 54 - 59), and hymenopterans (Campbell and Hanula 2007, J. Insect Cons. 11: 399 - 408; Stephen and Rao 2005, J. Kansas Entomol. Soc. 78: 373 - 380). Species often show strong attraction to certain colors which permits the development of selective monitoring traps for them (Kirk 1984, Ecol. Entomol. 9: 35 - 41). Of particular interest here are the hemipterans, adults of which are typically monitored in agricultural environments using yellow traps. For example, false chinch bug (*Nysius raphanus* Howard) in Colorado (Cranshaw 2006, Phytoparasitica 34: 197 - 203), plant bugs (*Lygus* spp.) in Washington (Landis and Fox 1972, Environ. Entomol. 1: 464 - 465), and psyllids in West Virginia (Cooper et al. 2010, Can. Entomol. 142: 188 - 191) were all highly attracted to yellow traps.

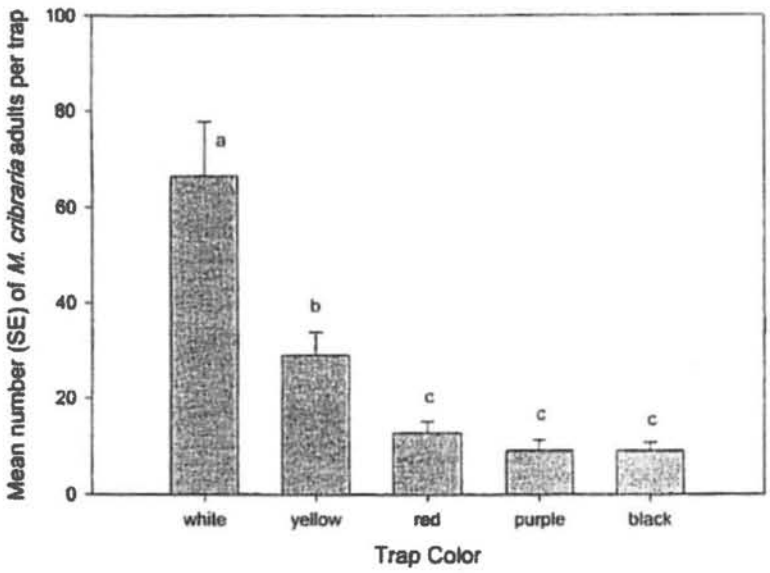

Fig. 2. Mean number (±SE) of adult *M. cribraria* captured in different colored cross-vane traps. Bars with the same letter are not significantly different ($P < 0.05$) according to the REGWQ.

Our objective was to determine the effect of trap color on catches of adult *M. cribraria*. The study was conducted in a kudzu field approx. 30 ha in size in Athens, GA. Early-season evaluations of the field showed large numbers of over-wintered adults with females beginning to lay eggs. On 10 May 2010, we established 4 rows each containing a white, yellow, purple, red, and black cross-vane trap. Rows were spaced approx. 50 m apart and traps were 5 m apart within rows. We used plexiglass cross-vane traps (Fig. 1) identical to those of Ulyshen and Hanula (2007, Am. Midl. Nat. 158: 260 - 278) but our buckets were gray instead of white and the plexiglass panels were spray painted one of the 5 colors. Traps were operated continuously from 10 May to 5 July 2010 and checked weekly. Collection buckets were filled with a soapy-water solution and all adult *M. cribraria* collected in them were counted in the field. Data were analyzed using a two-way analysis of variance (ANOVA) (SAS Institute 1982). Means separation was achieved using the Ryan-Einot-Gabriel-Welsch (REGWQ) multiple range test. We used the $\log_{10}(x + 1)$ transformation to reduce heteroscedasticity (Sokal and Rohlf 1981).

A total of 4,057 *M. cribraria* were collected, and color significantly affected trap catches ($F = 47.00$; df = 4,12; $P < 0.0001$). White traps captured over twice the number of *M. cribraria* as yellow traps and both colors captured significantly more than black, purple, or red (Fig. 2). Many monitoring programs use yellow traps for collection of phytophagous pests. Although yellow traps were effective for capturing the bean plataspid, white traps were much more effective capturing 53% of all *M. cribraria* collected in our study. Therefore, we suggest utilizing white traps to increase the likelihood of early detection and for monitoring relative abundance of this insect.

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