



SHORT NOTE

Effect of organic manures on the incidence of Asian citrus psyllid, *Diaphorina citri* Kuwayama

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Asian citrus psyllid (ACP), *Diaphorina citri* Kuwayama (Hemiptera: Psyllidae) is one of the major insect pests of citrus cultivars/groups viz., Nagpur mandarin, *Citrus reticulata* Blanco, sweet orange, *Citrus sinensis* (L.) Osbeck and acid lime, *Citrus aurantifolia* Swingle (Shivankar and Rao, 2010). Both nymphs and adults suck the vital plant sap from young shoots and cause heavy de-blossoming, thereby seriously affecting the fruit set. The psyllid is also known to transmit the disease, huanglongbing (HLB), *Candidatus Liberibacter asiaticus* (Bove, 2006). It is active during spring and in dry spells during monsoon (Shivankar *et al.*, 2001). The ACP is important as a pest on Nagpur mandarin and as a vector of HLB on sweet orange (Das *et al.*, 2002). The epidemics of *D. citri* on Nagpur mandarin were reported in central India during 1960-62, since then ACP has attained endemic pest status causing considerable loss (Shivankar and Rao, 2010). At present, the most common practice for management of ACP is through foliar application of insecticides particularly organo-phosphates, carbamates and neo-nicotinoids (Batra *et al.*, 1990, Kalidas and Shivankar, 1994, Dahia *et al.*, 1994, Singh *et al.*, 1995, Patel *et al.*, 1998, Chakravarthi *et al.*, 1998, Rao and Shivankar, 2010). However, safer and effective alternative methods are the need of the hour to contain ACP on sustainable basis. In this context, cultural methods like organic manuring play an important role in containing ACP in Nagpur mandarin orchards of central India. Therefore, the present study was conducted to assess the effect of organic manuring on ACP population which may play a vital role as one of the important components in the development of IPM module.

Effect of different organic manures viz., farm yard manure (FYM) at the rate of 20 kg/tree, vermicompost at the rate of 10 kg/tree, poultry manure at the rate of 10 kg/tree, green manuring with cow pea, *Vigna unguiculata* (L.) and sun hemp *Crotalaria juncea* L. along with in-organic fertilizers (300g N, 100g P, 50g K/tree)

in a 12 year old orchard of Nagpur mandarin on the incidence of *D. citri* conducted during 2010, 11 and 12 at Experimental Farm of National Research Centre for Citrus, Nagpur. Sun hemp and cowpea plants were sown in the basin of the Nagpur mandarin tree during rainy season and grown-up plants on reaching flowering stage were incorporated in to the soil. The experiment was laid out in completely randomized block design and each treatment replicated five times. Each replication consisted of two trees. Observations on psyllid population/5cm twig from two twigs on each side covering all the four directions of the tree, were recorded at fortnightly intervals during spring 2010, 2011 and 2012. The data were transformed to square root values and were subjected to analysis of variance.

Effect of organic manuring on ACP population showed that among the organic manuring treatments, ACP population was significantly low in vermicompost (15.91-18.55 population/5cm twig) than other treatments but was at par with FYM (16.38-19.46 population/5cm twig) during 2010 and 11. In all the three years, ACP population was significantly high in in-organic fertilizer treatment (24.0-36.36 population/5cm twig) than organic manure treatments (15.91-33.34 population/5cm twig) (Table 1). The results are in congruent with Ravi *et al.* (2006) who reported reduced incidence of leafhopper, *Amrasca biguttula biguttula* (Ishida) and whitefly, *Bemisia tabaci* Genn. in vermicompost treated Sunflower (*Helianthus annuus* L.). The low ACP populations in vermicompost treatment are probably due to the accumulation of more Potassium in soil as well as leaves of the Nagpur mandarin trees treated with vermicompost over the years (Anonymous, 2012). Further, increased levels of potassium fertilizer in Valencia orange (*Citrus sinensis* Blanco) plants grown under green house conditions resulted in decreased fitness (psyllid weight, egg production, development time) of psyllid population (Rogers, 2010). The organic vermicompost amendment

Table1. Effect of organic manures on the incidence of Asian citrus psyllid, *Diaphorina citri*

Treatment	No. psyllid nymphs/5 cm twig			
	2010	2011	2012	Pooled mean
FYM @ 20 kg/tree	16.38 (4.08) ^a	19.46 (4.40) ^a	23.30 (4.80) ^b	19.71 (4.42)
Vermicompost @ 10 kg/tree	15.91 (4.00) ^a	18.55 (4.27) ^a	18.10 (4.24) ^a	17.52 (4.17)
Poultry manure @ 10 g/tree	16.58 (4.10) ^b	27.18 (5.30) ^b	32.72 (5.71) ^d	25.49 (5.03)
Green manuring with cowpea	17.31 (4.19) ^b	27.67 (5.28) ^b	31.74 (5.63) ^c	25.47 (5.03)
Green manuring with sunhemp	17.73 (4.24) ^b	29.89 (5.30) ^{bc}	33.34 (5.77) ^e	26.65 (5.10)
Fertilizer 600g N+200g P+100g K	24.00 (4.92) ^c	32.22 (5.69) ^c	36.36 (6.02) ^f	31.86 (5.54)
SEd±	0.14	0.30	0.29	-
CD (p = 0.05))	0.30	0.64	0.32	-

Figures in parentheses are square root transformed values

Values followed by same letter in a column are not significantly different

probably increased the total phenol content and also the activity of enzymes viz., polyphenol oxidase and peroxidase in Nagpur mandarin trees which might be responsible for the reduced ACP incidence. The present study generated useful information on ACP population reduction in spring flushes of Nagpur mandarin through application of vermicompost at the rate of 10 kg/tree during rainy season which may well be taken in to consideration as an important component of IPM for the management of ACP in Nagpur mandarin orchards of Central India.

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