J. Exp. Zool. India Vol. 20, No. 2, pp. 913-918, 2017 | www.connectjournals.com/jez | *ISSN 0972-0030*

EFFECT OF TRAP CROPPING SYSTEM ON THE POPULATION DYNAMICS OF *HELICOVERPA ARMIGERA* (HUBNER) IN CHICKPEA AGRO-ECOSYSTEM

Salman Ahmad, Mohammad Shafiq Ansari[1], Hadi Husain Khan[2], Malik Mobeen Ahmad and Saba Siddiqui

Integral Institute of Agricultural Science and Technology, Integral University, Lucknow, India.

[1]Department of Plant Protection, Faculty of Agricultural Sciences, Aligarh Muslim University, Aligarh, India.

[2]Department of Entomology, Sam Higginbottom University of Agriculture, Technology and Sciences, Allahabad, India.

(Accepted 27 March 2017)

ABSTRACT : Effects of trap crops (pea, tomato, marigold, faba bean, berseem in ratio of 4:2, 6:2 and 8:2) were evaluated on the management of *H. armigera* for three cropping seasons of 2011-12, 2012-13 and 2013-14. In 2011-12, a total of 4.9 larvae/ meter row was in chickpea+tomato (4:2) compared to 9.9 larvae in sole chickpea. Pod damage was 39.5% in chickpea+pea (4:2) with highest yield of 1013.5 kg/ha compared to control (sole chickpea). In 2012-13, 4.5 larvae were recorded in chickpea+pea (6:2) compared to 9.3 larvae in sole chickpea at harvesting. Yield was higher (1011 kg/ha) with minimum pod damage of 39.2% in chickpea+pea (4:2) than to 937.4 in sole chickpea. In 2013-14, chickpea+berseem (4:2) cropping system caused a greater reduction in larval population (5.2 larvae/meter row) with highest yield of 1033.7 kg/ha than to 10.6 larvae with yield of 900.2 kg/ha in sole chickpea. Analyzed results showed that chickpea+tomato (4:2) cropping system offered lowest (39.00%) pod damage with highest yield of 1018 kg/ ha compared to other cropping systems and chickpea alone. Hence, chickpea + tomato (4:2) were found to be efficient trap crop against *H. armigera* in chickpea agro-ecosystem.

Key words : Trap cropping system, *H. armigera*, agro-ecosystem, population dynamics.

INTRODUCTION

Chickpea, *Cicer arietinum* (L.) remarkably predominates among other pulse crops in terms of area and production. Major chickpea-producing countries of the world are India (68%), Turkey (11%) and Pakistan (8%). It is grown in an area of about 6.67 million ha producing 5.3 million tons which represents 30% and 38% of national pulse acreage and production, respectively (Anonymous, 2012). A number of insect pests; gram pod borer, *Helicoverpa armigera*, *Heliothis* spp, semilooper, *Autographa nigrisigna*, gram cut worm, *Agrotis ipsilon*, termites, *Odontotermes obesus*, bruchids, *Callosobruchus chinensis* are reported to cause damage to chickpea but the major reason for decline in productivity can be accredited to damage caused by the gram pod borer, *Helicoverpa armigera* (Hubner). It is a polyphagous and serious pest; attacking a number of cultivated and wild host plants and a key constraint in production of several crops including chickpea, pigeon pea, chilli, tomato, okra, cotton, maize, sunflower, tobacco (Mehra *et al*, 2016; Kurl and Kumar, 2010; Babu *et al*, 2012; Ahmad *et al*, 2015). The characteristic feature of this pest is its highly migratory in nature, high survival and fecundity, more than one generation per year, survival on alternate host, high adaptations to various climatic conditions and ability to build up resistance against insecticides (Jacobson *et al*, 2009). Yield losses caused by this pest may go as high as 95-100% under farmer's field condition (Ahmad *et al*, 2014; Prakash *et al*, 2007) and pod damage could rise up to 100% (Singh and Yadav, 2009; Nitharwal *et al*, 2016).

In plant-based systems, naturally generated plant stimuli can be exploited using vegetation diversification, including inter and trap cropping (Cook *et al*, 2007). Trap crops, important components of cultural control, are composed of one or more plant species grown to attract a pest species in order to protect a nearby cash crop. Protection may be achieved by preventing the pest from reaching crop, or by concentrating the pest in a portion of field where it can be managed (Shelton and Nault, 2004) and may serve as a resource for natural enemies that can then increase and suppress the pest populations. It was a common method of pest control for several cropping systems prior to the introduction of modern synthetic insecticides (Talekar and Shelton, 1993; Hegde *et al*, 2016). It is an integrated pest management (IPM) approach that can be utilized on a farm level or an area wide basis and essentially a method of concentrating a pest population into a manageable area by providing the pest with an area of a host crop or an area of a preferred host crop (Shelton and Badenes-Perez, 2006; Kumar *et al*, 2015). Trap crops have an important attribute that it is distinctly more attractive to the pest than to main crop and have additional function for natural enemies. They