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Locule wise preference, parasitization and management of pigeonpea pod fly, *Melanagromyza obtusa* Malloch

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Abstract

It was observed that *M. obtusa* preferred 2nd locule most, followed by 3rd, 1st, 4th, and 5th locules in both cultivars during 2012-13 but present sequence were slightly changed and 5th locule was not preferred in Narendra Arhar 1 during 2013-14. The maximum level of parasitization 25.00 & 22.22 per cent during 2012-13 and 12.50 & 4.87 per cent during 2013-14 was observed by *Ormyrus orientalis* in Narendra Arhar 1 and Bahar. Emamectin benzoate 5 SG @ 11g a.i. showed minimum infestation 2.60% and 2.40% respectively, on Narendra Arhar 1 during 2012-13 & 2013-14 and gave maximum and significantly more protection to pods. It was followed by spinosad 45 SC, novaluron 10EC, indoxacarb 14.5 EC, imidacloprid 17.8 SL, and acephate 75 SP. Emamectin benzoate 5 SG 11g a.i. registered 10.30 and 8.20 per cent pod damage, 6.00 and 5.20 per cent grain damage and 22.20 and 20.00 per cent weight loss respectively, on Narendra Arhar 1 during 2012-13 and 2013-14. Emamectin benzoate 5 SG @ 11g a.i./ha was found most effective and produce higher grain yield 16.50 and 18.00 q/ha on Narendra Arhar 1 during 2012-13 and 2013-14 followed by Spinosad 45 SC 60g a.i., novaluron 10EC 100g a.i., indoxacarb 14.5 EC 60g a.i, Imidacloprid 17.8 SL 60g a.i. and Acephate 75 SP 600g a.i. The least effective treatment was acephate 75 SP 600g a.i. /ha which produced grain yield of 11.20 and 13.00q/ha, respectively during 2012-13 and 2013-14. Highest cost benefit ratio 1:7.2 and 1: 8.5 respectively, during 2012-13 and 2013-14 were obtained from the plots treated with emamectin benzoate 5 SG 11g a.i. /ha followed by spinosad 45 SC 60g a.i.

Keywords: Locule wise, parasitization, pigeonpea pod fly, *Melanagromyza obtusa* Malloch

Introduction

Pigeonpea *Cajanuscajan* (L) Millsp. is one of the most important legume crop of the India. It also known by names such as red gram, arhar and tur in India, offers nutritional security due to its richness in protein (21%) along with mineral supplements viz., iron and iodine. India is the world's largest producer and consumer of pulses including pigeon pea. About 90% of the global pigeon pea area (4.9 m. ha) is in India contributing to 93% of the global production. India produces 3.02 million tonnes from 3.81 million hectares area and state productivity levels varies from 360 to 1199 kg/ha. In Uttar Pradesh, total area under pulses cultivation is about 0.311 million ha with production and productivity of 0.373 million tonnes and 1199 kg/ha, respectively (Anonymous. 2014) ^[1]. Among the pod borer complex, the pod borer, *Helicoverpa armigera* (Hubner) and pod fly, *Melanagromyza obtusa* Malloch are the most serious and key insect pest, together causing 80 to 90 per cent of total insect pest caused damage in pigeonpea. *Melanagromyza obtusa* females produce up to 80 eggs and lay them individually into developing pods. Development of the immature stage under field conditions include 3-5 days for the egg stage, 6-11 days for the three larval instars, and 9-23 days for the pupal stage. Adults live up to 12 days when fed with honey and about half as long without food. Narrow host range and feeding niche of *M. obtusa* govern its population dynamics.

Materials and Methods

To study the locule wise preference and parasitization, one hundred pods from each variety were plucked and brought to the laboratory at monthly intervals. The number of healthy and damaged pods were recorded by dissecting individual pod. Larvae/ pupae of pod fly and their numbers present in each pod was recorded locule wise. At maturity stage, weight of healthy and damaged seeds along with number was also recorded and per cent pod fly incidence calculated. The collected pods, bearing larvae and pupae reared in glass jars covered with muslin cloth, for the rearing of parasitoids in temperature range varying from 23 °C to 33 °C and humidity range varying from 75 to 85 per cent. In order to find out economic and effective insecticide against the pod fly an experiment was laid out in Randomized Block Design (RBD) with 7 treatments including control in three replications. The Pigeonpea variety "Narendra

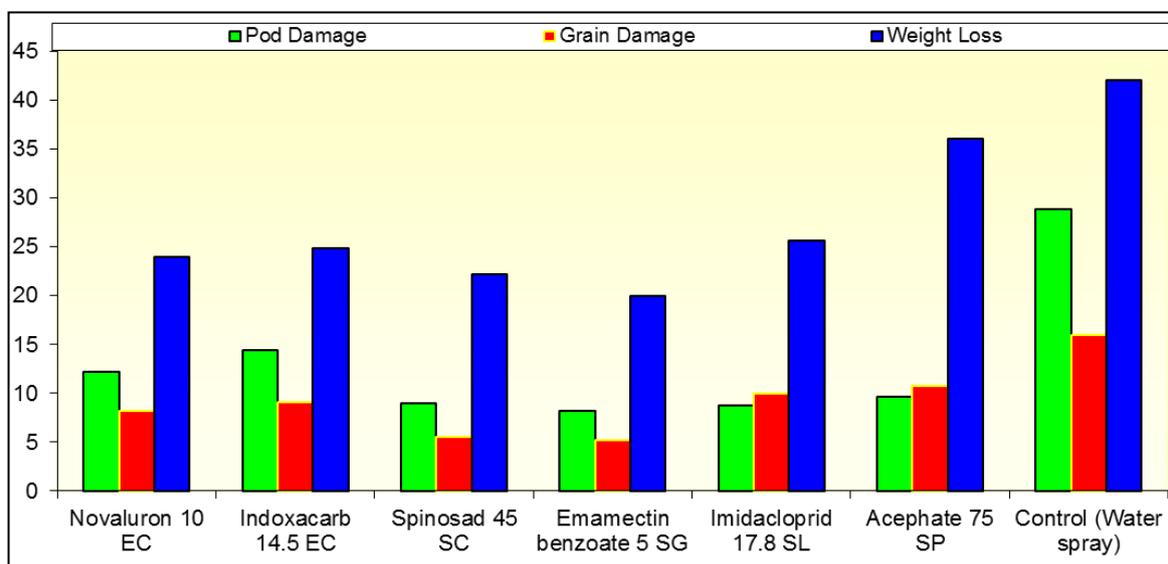
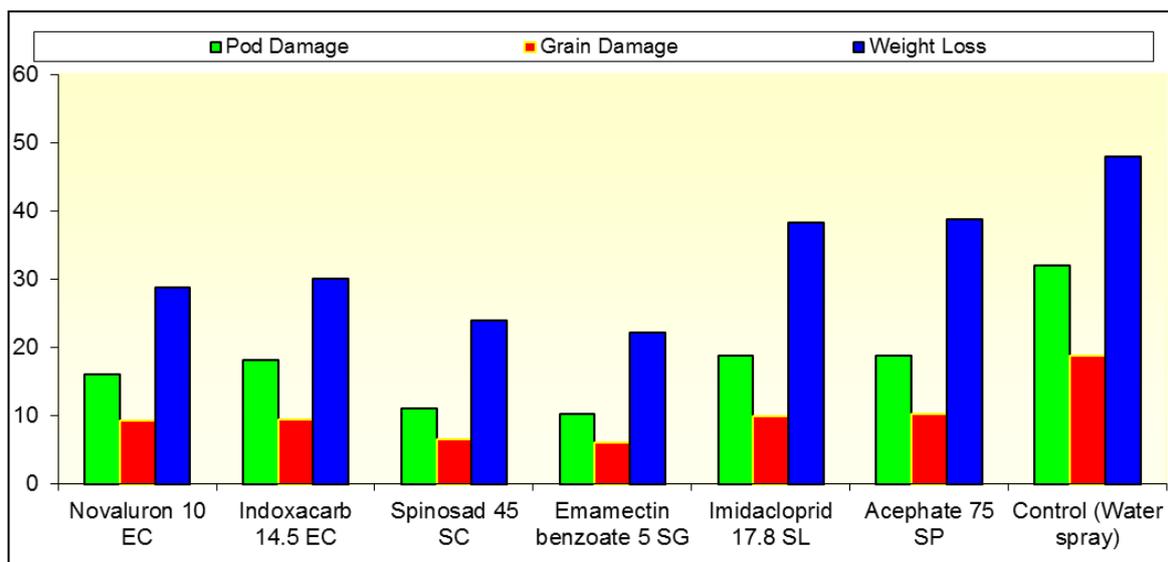
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Arhar 1st was sown in 5x4 sq. m. plot size in the 1st week of July during 2012 and 2013.

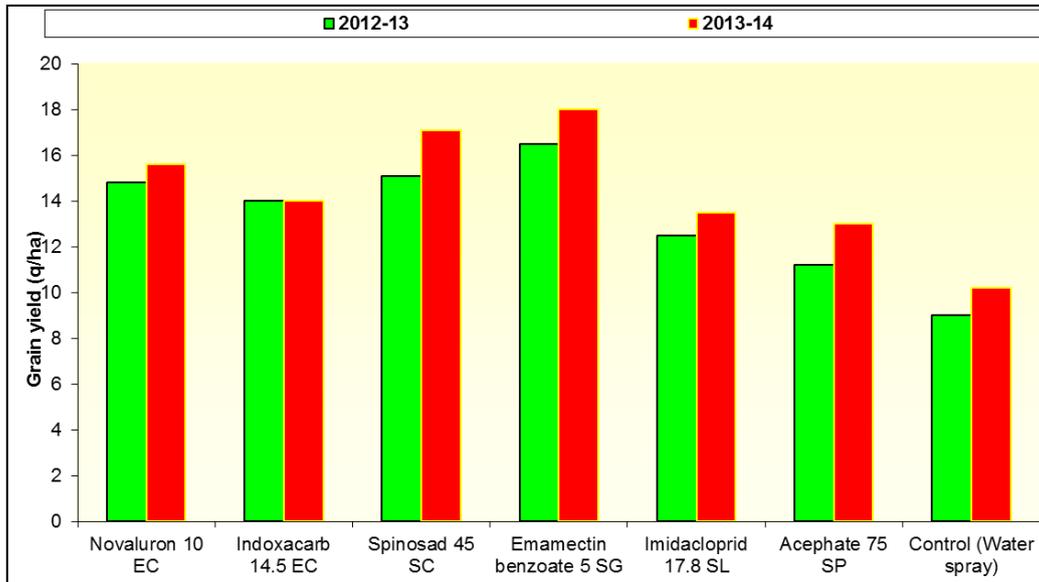
Results and Discussion

M. obtusa preferred 2nd locule most followed by 3rd, 1st, 4th and 5th locules for egg laying/ damage both the years. This finding is in accordance with finding of Lal *et al.* (1988) [3] and Das and Katyar (1998) who had also reported middle of locules as most preferred locule for egg laying / damage caused by *M. obtusa* followed by basal and dorsal ones. A larval cum pupal parasitoid *Ormurus orientalis* found associated with this pest and causing 10.25 to 25.00 per cent in Narendra Arhar 1 and 6.38 to 22.22 per cent parasitization in Bahar and 16.66 per cent to 12.50 per cent in Narendra Arhar 1 & 16.00 to 4.87 per cent in Bahar from 4th week of February to 3rd week of April during 2012-13 & 2013-14. This finding is in accordance with finding of Dar *et al.* (2005) [2] reported that Parasitization increased with the increase in pest population irrespective of the parasitoid species. Emamectin benzoate 5 SG @ 11g a.i. showed minimum infestation (2.60%) and gave maximum and significantly more protection to pods. It was followed by spinosad 45 SC @ 60g a.i., novaluron 10EC @ 100g a.i., indoxacarb 14.5 EC @ 60g a.i., imidacloprid 17.8 SL 60g a.i. and acephate 75 SP 600g a.i. /ha in which, respectively 2.80, 3.20, 4.10, 4.80 and 4.80 per cent pod damage were recorded

in both the years. During 2013-14, revealed that all the treatments were significantly superior over control. Emamectin benzoate 5 SG again showed minimum infestation (2.40%) and gave maximum and significantly more protection to pods. It was followed by spinosad 45 SC, novaluron 10EC, indoxacarb 14.5 EC, imidacloprid 17.8 SL, and acephate 75 SP in which, respectively 2.80, 4.00, 4.10, 4.40 and 4.80 per cent pod damage were recorded. Data on yield revealed that during 2012-13, emamectin benzoate 5 SG @ 11g a.i./ ha produce higher yield (16.50 q/ha) followed by spinosad 45 SC 60g a.i., novaluron 10EC 100g a.i., indoxacarb 14.5 EC 60g a.i., imidacloprid 17.8 SL 60g a.i. and acephate 75 SP 600g a.i. /ha in which 15.10, 14.80, 14.00, 12.50 and 11.20 q/ha respectively, grain yield were recorded and during 2013-14, emamectin benzoate 5 SG 11g a.i./ha registered higher yield (18.00 q/ha) followed by spinosad 45 SC 60g a.i., novaluron 10EC 100g a.i., indoxacarb 14.5 EC 60g a.i., imidacloprid 17.8 SL 60g a.i. and acephate 75 SP 600g a.i. /ha in which 17.10, 15.60, 14.00, 13.50 and 13.00 q/ha respectively, grain yield were recorded which were at par with each other. Highest cost benefit ratio 1:7.2 and 1: 8.5 respectively, during 2012-13 and 2013-14 were obtained from the plots treated with emamectin benzoate 5 SG 11g a.i. /ha followed by spinosad 45 SC 60g a.i.



Effect of various treatments on pod, grain damage and weight loss caused by *M. obtusa* during 2012-13 & 2013-14



Effect of various treatments on grain yield of pigeonpea

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