INTERNATIONAL JOURNAL OF PLANT PROTECTION | VOLUME 7 | ISSUE 1 | APRIL, 2014 | 246-247
e ISSN-0976-6855 | *www.researchjournal.co.in* | Open Access

IJPP

RESEARCH NOTE

Residual toxicity of *Nomuraea rileyi* (Farlow) Samson against *Helicoverpa armigera* (Hubner) on pigeonpea

■ A.H. BARAD, M.N. KAPADIA AND D.M. JETHVA*

Department of Entomology, Junagadh Agricultural University, JUNAGADH (GUJARAT) INDIA

ARITCLE INFO

Received : 01.11.2013
Accepted : 20.03.2014

Key **W**ords :
Persistent effect, *Nomuraea rileyi*, Pigeonpea

***Corresponding author:**
Email: dr_dharmraj@yahoo.co.in

ABSTRACT

A field – cum – laboratory trial was conducted to determine the persistent effect of *Nomuraea rileyi* (Farlow) Samson against *Helicoverpa armigera* (Hubner) on pigeonpea at Junagadh Agricultural University Campus, Junagadh during *Kharif* season of 2009-10. The results revealed that *Nomuraea rileyi* persisted up to 11 days of application with expressing the maximal persistency up to 5 days of its application on pigeonpea pods. The larval mortality became half within seven days.

How to view point the article : Barad, A.H., Kapadia, M.N. and Jethva, D.M. (2014). Residual toxicity of *Nomuraea rileyi* (Farlow) Samson against *Helicoverpa armigera* (Hubner) on pigeonpea. *Internat. J. Plant Protec.*, **7**(1) : 246-247.

Pigeonpea [*Cajanus cajan* (L.) Millsp.] is an important pulse cum grain legume crop in semi-arid tropical and subtropical areas of India. Gujarat occupies an area of 2.44 lakh hectares with the production of 2.57 lakh tonnes of pigeonpea grain with the productivity of 1053 kg ha^{-1} (Anonymous, 2012). *Helicoverpa armigera* (Hubner) is a serious pest of pigeonpea. The indiscriminate use of chemical pesticides has caused the environment pollution and insecticidal resistance. Hence, entomologists and environmentalists felt to develop viable alternate strategies which could be integrated into a workable system called integrated pest management. Among such eco-friendly approaches, entomopathogenic fungi form one of the most important components which are being employed to control noxious insect pests of pigeonpea ecosystem *viz.*, *H. armigera.* Among several entomopathogenic fungi, *Nomuraea rileyi* (Farlow) Samson is an important natural mortality factor of many lepidopteran pests on variety of crop ecosystem. Looking to the importance of *N. rileyi* as microbial control agent, it is highly necessity to evaluate the persistent effect of *N. rileyi* against *H. armigera* on pigeonpea.

A field – cum – laboratory trial was conducted to study the persistent effect of *N. rileyi* on pigeonpea at Junagadh Agricultural University campus, Junagadh during *Kharif* season of 2009-10. For this purpose, *N. rileyi* @ 2.5 kg/ha was sprayed on pigeonpea in the field and then the immature pod samples were collected after 1, 2, 3, 5, 7, 9 and 11 days after application. One day starved third instar larvae were kept in plastic boxes (7.5 cm height x 2.5 cm diameter) and allowed to feed on these treated pigeonpea immature pods for 24 hours, and then the fresh, untreated immature pods were provided daily to the larvae for feeding. Thirty larvae were used in each treatment, and each treatment was repeated thrice. The larval mortality was recorded at 4, 5, 6 and 7 days after exposure. Persistent toxicity (PT) was worked as per following formula suggested by Sarup *et al.* (1970) :

Persistent toxicity (PT) = Period of time (PT) × Average toxicity of the insecticide (T)

The data (Table 1) showed that after four days of pods feeding, a significant highest larval mortality was observed on pigeonpea pods collected after one day of *N. rileyi* application (3.33 %), and it was at par with the subsequent pod samples collected at 2nd, 3rd, 5th, 7th, 9th and 11th days of application (3.33 to 2.77 %). After five days of feeding indicated that highest larval mortality was observed with pod sample collected after first day of treatment (25.82 %) and it was at par with pod sample collected at 2nd and 3rd days of treatment,

Table 1 : Larval mortality in 3rd instar of *H. armigera* at different days of *N. rileyi* application in pigeonpea field

Pod samples collected (days after application)	Larval mortality (%) (days after feeding)			
	4	5	6	7
1	10.52* (3.33)	30.54* (25.82)	39.69* (40.78)	46.00* (51.74)
2	10.52 (3.33)	27.72 (21.64)	36.70 (35.71)	44.56 (49.23)
3	9.57 (2.77)	28.70 (23.06)	32.56 (28.97)	38.21 (38.26)
5	9.57 (2.77)	21.88 (13.89)	29.87 (24.81)	36.16 (34.81)
7	9.57 (2.77)	17.57 (9.11)	24.50 (17.20)	30.54 (25.82)
9	9.57 (2.77)	12.74 (4.86)	21.42 (13.33)	27.72 (21.64)
11	9.57 (2.77)	10.52 (3.33)	20.67 (12.46)	24.71 (17.48)
S. Em. ±	0.42	1.46	1.83	2.20
C.D. (P=0.05)	1.25	4.33	5.44	6.54
C.V. %	8.28	13.62	12.48	12.43

*Angular transformation, Figures in parentheses are original values

which recorded 21.64 and 23.06 per cent mortality, respectively. The subsequent pod samples (at 5th, 7th, 9th and 11th days) registered the larval mortality in a decrease manner (13.89 to 3.33 %).

On sixth day of pod feeding, the highest larval mortality was observed with pod sample collected after first day of treatment (40.78 %) and it was at par with pod sample collected at 2nd day of treatment, which recorded 35.71 per cent mortality. The subsequent pod samples (at 3rd, 5th, 7th, 9th and 11th days) registered the larval mortality in a decrease manner (28.97 to 12.46 %).

After seven days of feeding, leaf samples collected on the first day of *N. rileyi* application was found the most effective with 51.74 per cent larval mortality. It was at par with pod sample collected at 2nd day of treatment, which recorded 49.23 per cent mortality. The subsequent pod samples (at 3rd, 5th, 7th, 9th and 11th days) registered the larval mortality in a decrease manner (38.26 to 17.48 %).

The data (Table 1) also revealed that the pigeonpea pods treated with *N. rileyi* @ 2.5 g/lit caused the mortality in *Helicoverpa* larvae up to 11 days of its application with maximal mortality up to 5 days of application. The larval mortality became half within 7 days.

Persistence of *N. rileyi* retained up to 10 days on groundnut foliage during *Kharif* (Patil, 2000) and 9 days on soybean (Ignoffo *et al.*, 1976). Bell (1975) reported that the conidiospores of *N. rileyi* produced 98 per cent mortality of *Heliothis zea* (Boddie) after 14 days, whereas the blastospores produced no mortality after 21 days. Gardner *et al*. (1977) reported that the effects of rainfall, relative humidity and direct solar radiation were the possible reasons for the decreased in pathogen activity of *N. rileyi*. Fargues *et al.* (1988) reported that the viable spore half-life appeared to be dependent on sunlight intensity. The results obtained in present investigation are in close agreement with the results of earlier workers.

From the above results, it can be concluded that *N. rileyi* persisted up to 11 days but exposed the persistence more up to 5 days of application, and caused the larval mortality half with seven days.

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