

Seasonal abundance of major sucking insect pests of pigeonpea and their natural enemies in Northern dry zone of Karnataka

Pigeonpea [*Cajanus cajan* (L.) Millsp.] is an important pulse crop in the semi-arid tropics and subtropical farming systems. It is mainly used as 'dal'. It is rich in iron, iodine and the essential amino-acids like lycine, cystine and arginine. India is the center of origin for pigeonpea. In India, the area under pigeonpea was 4.04 million hectares with the production of 2.65 million tonnes and productivity 656 kg per hectare (Anon., 2012). Maharashtra, Uttar Pradesh, Madhya Pradesh, Karnataka, Gujarat, Andhra Pradesh, Tamil Nadu and Bihar are the major pigeonpea growing states of our country. Karnataka ranks second in area (0.77 million ha) and production (0.36 million tonnes) with a productivity of 466 kg per ha (Anon., 2012). It is being grown as a sole crop as well as intercrop in Gulbarga, Bidar, Raichur, Vijayapur and Koppal districts of Karnataka.

Among the several factors responsible for low yields of pigeonpea, the insect pests are major ones. Pigeonpea is damaged by about 300 species of insect pests infesting at various growth stages. Among which the major threat is posed by pod borers and sucking insects. In sucking insect pest complex *Empoasca kerri* Pruthi, *Aphis fabae* Scopoli, *Megalurothrips*

usitatus Bagnall, *Clavigralla gibbosa* Spinola species are common and are considered as important.

The intensive roving survey was undertaken during 2013-14 at different stages of the crop covering Vijayapur, Sindagi, Indi, Muddebihal and Basavana Bagewadi talukas. From each taluka, five fields were selected and from each field five plants were selected for the study. Observations were recorded at different crop growth stages viz., seedling (30 days after sowing), vegetative (30-45 days after sowing) and reproductive stage (75 days after sowing) by recording number of thrips per flower, leaf hoppers per three leaves and pod bug per plant, simultaneously observations on natural enemies were also recorded per plant.

Among the different talukas surveyed, higher population of leaf hoppers (10.04/3 leaves) was recorded in Muddebihal while, lower population of leaf hoppers (4.24/3 leaves) was noticed in Indi taluka. During vegetative stage of the crop, highest population of thrips (2.04/3 leaves) was recorded in Basavana Bagewadi while lowest population (0.56/3 leaves) in Sindagi taluka. The lowest population of leaf hopper

Table 1. Seasonal abundance of major sucking insect pests in pigeonpea growing areas of Vijayapur district at different crop growth stages

Taluka	Village	Seedling stage		Vegetative stage		Reproductive stage		
		Thrips/ flower	Leafhoppers/ 3 leaves	Thrips/ flower	Leafhopper/3 leaves	Thrips/ flower	Pod bugs/ plant	Leafhoppers/ 3 leaves
Basavana	B.Bagewadi	-	9.40	2.40	10.40	5.60	2.80	10.40
Bagewadi	Kudagi	-	9.80	0.80	9.20	4.80	3.00	10.60
	Managuli	-	8.00	3.00	8.80	5.20	3.20	10.60
	Masuti	-	8.60	2.40	10.20	5.20	2.20	11.00
	Muttagi	-	8.20	1.60	9.40	4.80	3.20	10.20
Taluka Mean			8.80	2.04	9.60	5.12	2.88	10.56
Vijayapur	Hitnalli	-	5.20	0.80	6.20	9.80	3.40	12.60
	Jumnal	-	6.20	1.20	6.40	6.20	4.40	11.00
	Kalvalagi	-	6.00	0.20	6.20	5.60	4.20	12.60
	Kamtagi	-	5.20	1.00	4.80	7.00	3.00	12.80
	Sarwad	-	5.80	0.60	5.20	6.00	3.80	11.60
Taluka Mean			5.68	0.76	5.76	6.92	3.76	12.12
Indi	Atharga	-	3.80	1.00	9.60	12.00	5.00	13.60
	Horthi	-	4.60	0.80	9.40	14.40	6.00	12.80
	Indi	-	4.20	1.60	8.80	11.00	4.80	13.80
	Nagthana	-	4.60	2.20	9.40	11.20	5.60	14.60
	Thamba	-	4.00	1.20	8.80	12.60	5.00	13.20
Taluka Mean			4.24	1.36	9.20	12.24	5.28	13.60
Muddebihal	Balaganur	-	10.00	0.60	8.60	6.60	4.00	11.60
	Hoovinahippargi	-	9.80	0.80	9.60	6.00	3.40	11.80
	Muddebihal	-	10.40	0.40	9.00	5.80	4.60	11.60
	Tamadaddi	-	9.80	0.60	8.40	6.20	2.60	11.40
	Talikote	-	10.20	1.00	8.60	5.60	4.00	11.40
Taluka Mean			10.04	0.68	8.84	6.04	3.72	11.56
Sindagi	Bandal	-	6.00	0.60	7.60	10.60	4.40	13.60
	Chikkarugi	-	5.00	0.40	8.80	7.20	4.60	12.00
	Chndakote	-	5.60	0.40	8.00	6.20	4.80	13.20
	Devanahippargi	-	5.20	0.40	7.80	8.00	4.40	14.00
	Sindagi	-	5.40	1.00	8.00	6.80	4.20	13.00
Taluka Mean			5.44	0.56	8.04	7.76	4.48	13.16
	District Mean		6.84	1.08	8.29	7.62	4.02	12.20

Table 2. Seasonal abundance of natural enemies of major sucking insect pests in pigeonpea growing areas of Vijayapur district at different crop growth stages

Taluka	Village	Seedling stage			Vegetative stage			Reproductive stage		
		Coccinelids/ 5 plants	Green lace wings/ 5 plants	Spiders/ 5 plants	Coccinelids/ 5 plants	Green lace wings/ 5 plants	Spiders/ 5 plants	Coccinelids/ 5 plants	Green lace wings/ 5 plants	Spiders/ 5 plants
Basavana	B.Bagewadi	1.00	0.60	-	2.00	1.40	0.80	3.00	2.20	1.60
Bagewadi	Kudagi	0.60	0.60	-	2.20	2.00	0.80	2.60	2.60	1.00
	Managuli	0.60	0.60	-	2.20	1.40	1.20	3.40	2.00	1.80
	Masuti	0.80	0.40	-	2.20	1.20	0.40	2.80	1.60	1.20
	Muttagi	0.80	0.60	-	2.60	1.20	1.20	3.00	2.00	1.60
Taluka Mean		0.76	0.56		2.24	1.44	0.88	2.96	2.08	1.44
Vijayapur	Hitnalli	0.60	0.40	-	0.60	0.60	0.60	3.40	3.00	1.80
	Jumnal	0.40	0.60	-	0.80	0.60	0.80	3.00	3.40	2.00
	Kalvalagi	0.40	0.20	-	0.80	0.60	0.60	3.60	3.00	2.00
	Kumtagi	0.40	0.60	-	1.00	1.00	0.80	3.40	3.40	1.80
	Sarwad	0.60	0.40	-	1.00	1.20	0.20	3.60	2.80	2.00
Taluka Mean		0.48	0.44		0.84	0.80	0.60	3.40	3.12	1.92
Indi	Atharga	0.40	0.40	-	1.20	1.60	0.80	3.80	3.40	2.20
	Horthi	0.20	0.40	-	1.40	1.20	0.60	4.00	4.00	2.20
	Indi	0.40	0.40	-	1.60	1.20	1.00	4.40	2.40	2.00
	Nagthana	0.20	0.20	-	1.20	1.40	0.40	4.20	3.40	2.20
	Thamba	0.60	0.40	-	1.60	1.00	0.80	4.20	3.80	2.40
Taluka Mean		0.36	0.36		1.40	1.28	0.72	4.12	3.40	2.20
Muddebihal	Balaganur	1.00	1.00	-	1.00	1.60	0.40	2.08	2.80	1.40
	Hoovinahippargi	0.80	1.20	-	1.00	1.00	0.80	2.00	2.00	1.60
	Muddebihal	0.60	1.00	-	1.40	1.40	0.80	1.80	1.80	1.40
	Tamadaddi	1.20	0.80	-	1.40	1.20	0.20	2.40	3.20	1.20
	Talikote	1.00	1.00	-	0.60	0.80	0.80	2.20	2.00	1.60
Taluka Mean		0.92	1.00		1.08	1.08	0.60	2.10	2.36	1.44
Sindagi	Bandal	0.60	0.80	-	0.80	1.00	0.80	2.40	3.20	1.60
	Chikkarugi	0.60	0.40	-	0.80	0.40	0.60	2.40	2.60	1.60
	Chandkote	0.60	0.60	-	1.00	1.20	0.60	2.60	2.40	2.20
	Devanahippargi	0.40	0.60	-	1.00	0.80	0.40	2.60	3.20	1.80
	Sindagi	0.60	0.60	-	1.00	0.60	0.80	2.80	2.60	2.20
Taluka Mean		0.56	0.60	-	0.92	0.80	0.64	2.56	2.80	1.88
	District Mean	0.62	0.59		1.30	1.08	0.69	3.03	2.75	1.78

(5.76/3 leaves) was recorded in Vijayapur taluka while the highest population (9.60/3 leaves) was recorded in Basavana Bagewadi taluka during the vegetative stage. During reproductive stage, higher population of leaf hoppers was recorded in all the talukas of Vijayapur district ranging from 10.56 to 13.60 leaf hoppers per three leaves as compared to vegetative stage of the crop 5.76 to 9.60 per three leaves. Likewise, in reproductive stages higher thrips population was recorded in Indi (12.24/flower) and lowest in Basavana Bagewadi (5.12/ flower) taluka. Higher pod bug population was noticed in Indi (5.28/plant) taluka and lowest in Basavana Bagewadi (2.88/plant) taluka. Pod bugs were noticed in reproductive stage and remained till the harvest.

The data pertaining to natural enemies is presented in Table 2. The population of predators was low during seedling stage of the crop which ranged from 0.36 to 0.92 coccinellids per five plants in Indi and Muddebihal talukas. While the population of green lace wings ranged from 0.40 to 1.00 per five plants in Indi and Muddebihal talukas and there was no incidence of spiders in all the taluks. During vegetative stage, the population of coccinellids ranged from 0.84 to 2.24 per five plants in Basavana Bagewadi and Vijayapur talukas. Similarly, green lace wing

ranged from 0.80 to 1.44 per five plants in Sindagi and Basavana Bagewadi talukas. Spider population ranged from 0.60 to 0.88 per five plants in Muddebihal and Basavana Bagewadi talukas, respectively. During reproductive stage, the population of coccinellids ranged from 2.16 to 4.12 in Muddebihal and Indi talukas. While the highest populations of green lace wing (3.40/ 5 plants) were recorded in Indi taluka, whereas, the lowest population of green lace wings were recorded in Basavana Bagewadi (2.08/5 plants) taluka. Similarly, highest population of spiders were recorded in Indi (2.88/5 plant) taluka, where as the lowest in Muddebihal (1.44/5 plant) taluka.

From above results it can be concluded that, occurrence of sucking insect pests starts during seedling stage and gradually increases during vegetative stage and reaches peak during reproductive stage of the crop. The results are in accordance with Henry *et al.* (2003) who revealed that incidence of pod bugs ranged from 11.0 to 7.8 (overall mean 4.2) per plant and 18-35 per cent flowers damaged. The higher population of natural enemies was recorded during reproductive stage (where more incidence of pests was observed) as compared to seedling and vegetative stage of

the crop. The present findings are in agreement with Borah and Dutta (2003) who reported that, predatory spiders of *Helicoverpa armigera* (Hubner) in pigeonpea ecosystem included *Oxyopes ratnae* Tikader, *Oxyopes shweta* Tikader, *Neoscona* sp. and *Plexippus paykullii* Tikader & Biswas

which appeared from flowering until maturity and at senescence. Kumar and Nath (2003) reported that ladybird beetle, mirid bug, praying mantis, dragonfly, green lacewings and spiders were noticed on pigeonpea varieties in Western Rajasthan.

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(Received: July, 2014 ; Accepted: April, 2015)

References

- Anonymous, 2012, Directorate of Economics and Statistics, Department of Agriculture and Cooperation, Government of India.
- Borah, S.R. and Dutta, S.K., 2003, Predatory spiders of *Helicoverpa armigera* (Hubner) in pigeonpea. *Insect Environ.*, 9(1): 18-20.
- Henry, A., Kumar, D. and Singh, N. B., 2003, Incidence and intensity of *Clavigralla scutellaris* on pigeonpea varieties in Western Rajasthan. *In: Advances in Arid Legume Research*, Scientific Publishers (India), pp. 470-473.
- Kumar, A. and Nath, P., 2003, Natural enemies of pigeonpea insect pests at Varanasi, Uttar Pradesh, India. *Int. Chickpea & Pigeonpea Newsltr*, (10): 51-54.