

**RESEARCH ARTICLE :**

# Seasonal incidence of shorthorned grasshoppers in agriculture and forest ecosystem of Dharwad region

■ **B. RAGHAVENDER, A.S. VASTRAD, V. RATNAKAR, V. SUNIL AND B. THIRUPAM REDDY**

**ARTICLE CHRONICLE :**

**Received :**  
17.07.2017;

**Accepted :**  
01.08.2017

**SUMMARY :** Seasonal incidence of grasshopper revealed that population build up was started after the onset of monsoon showers and the adults were abundant during post monsoon period (July-November). In Dharwad, grasshopper population was minimum during April and maximum during September. In Prabhunagar (Forest ecosystem), grasshopper population was minimum during May and maximum during September. Diversity study during different seasons showed rainy season was more diverse followed by winter and summer season.

**How to cite this article :** Raghavender, B., Vastrad, A.S., Ratnakar, V., Sunil, V. and Reddy, B. Thirupam (2017). Seasonal incidence of shorthorned grasshoppers in agriculture and forest ecosystem of Dharwad region. *Agric. Update*, 12(TECHSEAR-6) : 1666-1672; DOI: 10.15740/HAS/AU/12. TECHSEAR(6)2017/1666-1672.

**KEY WORDS:**

Shorthorned grasshopper, Agriculture, Forest ecosystem

## BACKGROUND AND OBJECTIVES

Orthoptera is one of the most diverse Orders of Class Insecta. Locusts and grasshoppers constitute an economically important group of orthopterous pests that infest a number of cultivated and non-cultivated crops and belong to the suborder Caelifera in the order Orthoptera. The grasshoppers are widely distributed in all ecological systems with significant economic importance due to their destructive role to almost all type of green vegetation. Orthoptera is one of the largest insect orders, comprising 26,692 species found throughout the world. Acridoidea is the largest super family comprising 11,000 species worldwide of which 290 species representing 138 genera are reported from India. Among

these, Acrididae is the most diverse family with 8000 species of which 285 belonging to 135 genera are found in India of which 136 species and 28 genera are endemic (Akthar *et al.*, 2014). Ecological studies of shorthorned grasshoppers (Orthoptera: Acridoidea) fauna of Dharwad region including their host record, ecological distribution, life forms, food habits and morphometrics of grasshoppers has been well documented (Vastrad, 1986; Vastrad *et al.*, 1988, 1989 and 1991 and Vastrad, 1994). The aim of this work is to address the distribution of species in different seasons.

## RESOURCES AND METHODS

Grasshoppers were collected through sweeping net once in a month in 2<sup>nd</sup> week(10

**Author for correspondence :**

**B. RAGHAVENDER**  
Department of  
Agricultural  
Entomology, University  
of Agricultural Sciences,  
DHARWAD (KARNATAKA)  
INDIA  
Email: raghu3758  
@gmail.com

am-12 noon) in agriculture ecosystem (Main agriculture research station, Dharwad) and forest ecosystem (forest research station, Prabhunagar). During three different seasons (rainy, winter and summer) from February 2015 to January 2016 number of grasshoppers was recorded every month to know the seasonal incidence and relative abundance of grasshopper species was worked out during different seasons.

## OBSERVATIONS AND ANALYSIS

Build up of grasshopper population generally began soon after the receipt of first showers. In Dharwad grasshopper population was minimum (23) during April and maximum (178) during September (Table 1). In Prabhunagar population was minimum (31) in May and maximum (147) during September (Table 2).

### Agriculture ecosystem:

Populations of both pyrgomorphids and acridids increased after the first monsoon showers and reached peak during September (39 and 139, respectively) and declined thereafter. Among the pyrgomorphids *Atractomorpha crenulata crenulata* (Fabricius) was the most dominant which was recorded throughout the year except during April, 2015. Whereas, among the acridids *Spathosternum prasiniferum* (Walker) was the most abundant followed by *Eyprepocnemis alacrisalacris* (Serville), *Trilophidia annulata* (Thunberg) and *Acrida exaltata* (Walker). *E. alacrisalacris* and *A. exaltata* were active through the year (Table 1). Most of the species belonging to different subfamilies of Acrididae reached their peak incidence during September except Catantopinae, Cyrtacanthacridinae and Eyprepocnemidinae (Table 1).

### Forest ecosystem :

In the forest ecosystem also the trend in seasonal incidence of shorthorned grasshoppers was similar to agriculture ecosystem explained above, following monsoon showers the population of pyrgomorphids and acridids reached peak during September (30 and 147, respectively) and declined thereafter. As in the case of agriculture ecosystem *A. crenulata* was most dominant among the pyrgomorphids whereas *Colemanias phenariodea* (I. Bolivar) and *Aularches miliaris miliaris* (Linnaeus) were very rare. Among the acridids *S. prasiniferum* was most dominant followed by

*Eucoptacrapraemorsa* (Stal) and *Brachycrota phuslongiceps* I. Boliver which were active through the year. *Xenocatantopshumilis*, *Diabolo catantops* sp, *Pachyacris venosa* (Walker) and *Tristriapulvinata* (Uvarov) were very rare (Table 2).

Seasonal incidence revealed that abundance of shorthorned grasshopper was more during September and least in the month of April in agro ecosystem (Fig. 1). Similarly in forest ecosystem maximum abundance was recorded during September and minimum in the month of May (Fig. 2). Reason for the more abundance during September month is because availability of suitable breeding ground and plenty of green food. Minimum incidence during April and May might be due to lack of green food and unsuitable climatic conditions. Similar results were obtained by Vastrad (1986) and Akhtar *et al.* (2012) who reported that shorthorned grasshoppers were more abundant during the month of September.

### Agriculture ecosystem:

Regarding incidence of different species, *Atractomorpha crenulata crenulata* (Fabricius), *Acrida exaltata* (Walker), *Cyrtacantha cristatrica* (Linnaeus), *Eyprepocnemis alacrisalacris* (Serville), *Spathosternum prasiniferum* (Walker), *Ailopusthalas sinusthalassinus* (Fabricius), *Gastrimargasa africana* Saussure, *Trilophidia annulata* (Thunberg) were found throughout the year and this showed that occurrence of these species not affected by climatic conditions. On the contrary some of the species viz., *Xenocatantopshenryi*, *Mesambria* sp. and *Cheloboracrassa* were observed only during October. These results are in conformity with findings of Vastrad (1986) and Akhtar *et al.* (2012).

### Forest ecosystem :

In forest ecosystem seasonal incidence of shorthorned grasshoppers indicated that *Spathosternum prasiniferum* (Walker), *Diabolo catantopshumilis* (Walker), *Eucoptacrapraemorsa* (Stal), *Brachycrota phuslongiceps* I. Boliver, *Trilophidia annulata* (Thunberg) were found throughout the year, which may be due to wide host range and their acclimatization to wide fluctuations that prevail in climate.

*Colemanias phenarioides* (I. Bolivar) was found only during May, while *Aularches miliaris miliaris* (Linnaeus), *Xenocatantopshumilis* and *Diabolo catantops* sp. were recorded in the month of

**Table 1: Seasonal incidence in agriculture ecosystem**

Name of species	Feb-15	Mar-15	Apr-15	May-15	Jun-15	Jul-15	Aug-15	Sep-15	Oct-15	Nov-15	Dec-15	Jan-16	Abundance (number of specimens)
<b>Fam: Pyrgomorphidae</b>													
<i>Atractomorpha acrenulata acrenulata</i> (Fabricius)	5	11	0	4	5	3	6	11	13	10	2	2	72
<i>Chrotogonasoxypterus</i> (Blanchard)	4	0	0	2	0	0	0	8	8	3	0	2	27
<i>Chrotogona strachypterus</i> (Blanchard)	4	0	1	1	0	0	0	6	4	2	0	0	18
<i>Pyrgomorphabispinosabispinosa</i> (Walker)	0	0	0	0	2	7	11	14	11	7	0	0	52
Total	13	11	01	07	07	10	17	39	36	22	12	04	
<b>Fam: Acrididae</b>													
<b>Sub fam: Acridinae</b>													
<i>Acrida exaltata</i> (Walker)	5	2	7	4	7	10	13	16	10	7	6	4	91
<i>Phlaeobapanteli</i> Bolivar	0	4	2	0	0	2	4	2	1	0	0	1	16
Total	05	06	09	04	07	12	17	18	11	07	06	05	
<b>Sub fam : Catantopinae</b>													
<i>Cantopserubescens</i> (Walker)	0	1	0	0	0	0	0	0	0	0	0	0	1
<i>Stenocatantop splendens</i> (Thunberg)	0	0	0	1	0	0	0	0	0	0	0	0	1
<i>Xenocatantop skarnyi</i> (Kirby)	0	0	2	1	1	1	6	3	0	2	0	0	16
<i>Diabolocantantop spinguisimnotabalis</i> (Walker)	0	2	1	0	0	0	2	4	3	2	1	0	15
<i>Mesambria</i> sp.	0	0	0	0	0	0	0	0	1	0	0	0	1
<i>Xenocatantop shenryi</i>	0	0	0	0	0	0	0	0	1	0	0	0	1
Total	00	03	03	02	01	01	08	07	05	04	01	00	
<b>Sub fam: Coptacridinae</b>													
<i>Eucoptacra praemorsa</i> (Stal)	0	0	1	0	0	0	2	4	1	3	1	0	12
Total	0	0	1	0	0	0	2	4	1	3	1	0	
<b>Sub fam: Cyrtacanthacridinae</b>													
<i>Teratodes monticollis</i> (Grey)	1	5	0	0	0	0	0	1	0	0	0	0	7
<i>Anacridium flavensis</i> (Fabricius)	0	0	0	1	0	0	0	0	0	0	0	0	1
<i>Cyrtacanthacristatrica</i> (Linnaeus)	6	6	0	0	4	0	2	7	7	1	0	0	33
Total	07	11	00	01	04	00	02	08	07	01	00	00	
<b>Sub fam: Eyreprocnemidinae</b>													
<i>Eyreprocnemis alacrisalacris</i> (Serville)	6	5	5	3	24	32	36	7	1	4	1	2	126
Total	6	5	5	3	24	32	36	7	1	4	1	2	
<b>Sub fam: Gomphocerinae</b>													
<i>Aulacobothrus</i> sp.	0	4	0	0	0	0	0	0	0	2	0	0	6
Total	0	4	0	0	0	0	0	0	0	2	0	0	
<b>Sub fam: Hemiaceridinae</b>													
<i>Hieroglyphus banian</i> (Fabricius)	0	0	0	0	0	0	4	1	0	4	0	0	9
<i>Parahieroglyphus bilineatus</i> (I. Boliver)	0	0	0	2	0	0	0	0	0	0	0	0	2
<i>Spathosternum prasini ferum</i> (Walker)	0	0	0	0	21	27	31	38	21	14	9	10	171
Total	00	00	00	02	21	27	35	39	21	18	09	10	

Table 1: Contd.....

Table 1: Contd.....

<b>Sub fam: Oedipodinae</b>													
<i>Acrotylushumbertianus</i> Saussure	1	0	0	2	0	0	0	1	0	0	0	0	4
<i>Ailopusthalasinustamulus</i> (Fabricius)	0	0	0	2	0	2	0	0	0	0	0	0	4
<i>Ailopusthalassinusthalassinus</i> (Fabricius)	1	1	1	6	0	7	9	8	3	1	0	2	39
<i>Gastrimargasafricanaafricana</i> Saussure	1	5	3	2	3	1	2	9	4	3	0	0	33
<i>Morphocrisfasciata</i> Kirby	0	1	0	0	0	1	1	3	3	4	2	1	16
<i>Trilophidiaannulata</i> (Thunberg)	1	2	0	2	8	4	7	30	24	13	11	4	106
<i>Oedaleussenegalensis</i> (Krauss)	0	0	0	0	1	0	0	0	0	0	0	0	1
<i>Aiolopussimulatrix</i> (Savigny)	0	0	0	0	0	1	0	0	0	0	0	0	1
<i>Aiolopus</i> sp.	0	0	0	0	0	0	2	0	0	0	0	0	2
<i>Ditopternisvenusta</i> Walker	0	0	0	1	0	0	0	0	0	0	0	0	1
<i>Cheloboracrassa</i>	0	0	0	0	0	0	0	0	1	0	0	0	1
Total	04	09	04	15	12	16	20	51	35	21	13	07	
<b>Sub fam: Oxyinae</b>													
<i>Oxyahylahyla</i> Serville	0	0	0	0	0	0	0	4	2	4	1	0	11
<i>Oxyanitidula</i> (Walker)	0	0	0	0	0	0	1	1	0	0	0	0	2
Total	00	00	00	00	00	00	01	05	02	04	01	00	
Total of acrididae	22	38	22	27	69	88	122	139	83	50	12	24	
Grand total (Acrididae + Pyrgomorphidae)	35	49	23	34	76	98	139	178	119	86	34	28	

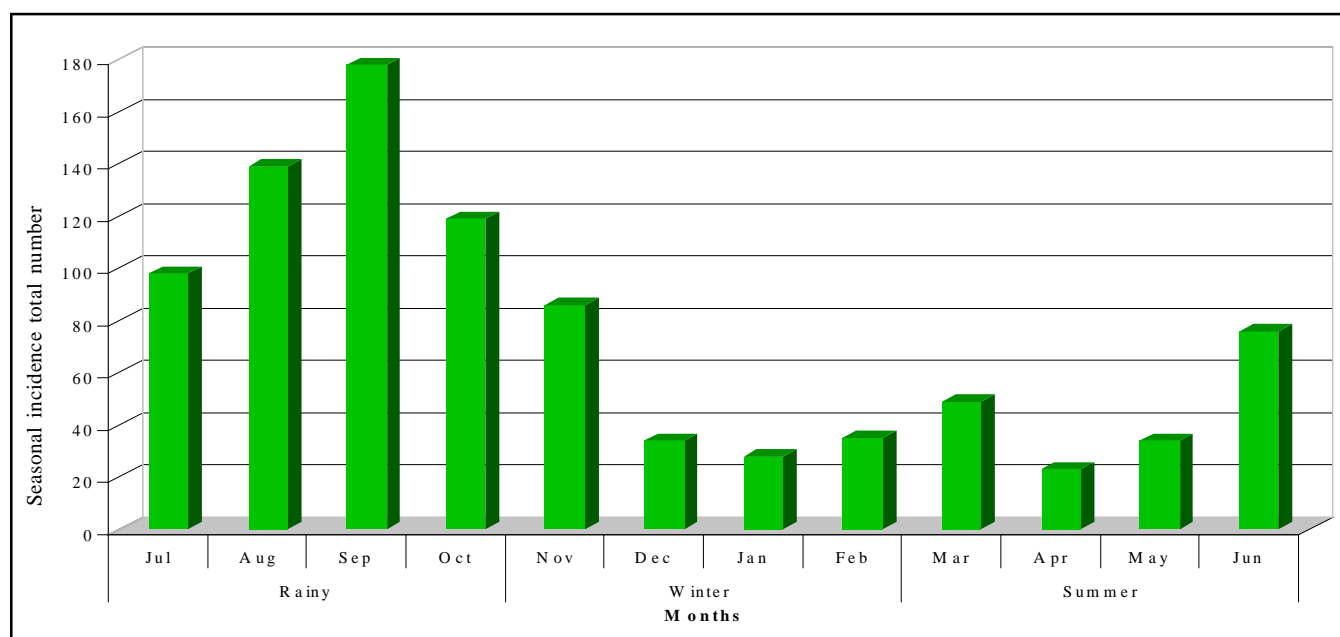


Fig. 1 : Seasonal incidence of shorthorned grasshoppers in agriculture ecosystem (MARS, Dharwad) during 2015-16

**Table 2 : Forest ecosystem**

Name of species	Feb-15	Mar-15	Apr-15	May-15	Jun-15	Jul-15	Aug-15	Sep-15	Oct-15	Nov-15	Dec-15	Jan-16	Abundance (number of specimens)
<b>Fam: Pyrgomorphidae</b>													
<i>Atractromorphacrenulatacrenulata</i> (Fabricius)	0	0	0	1	0	0	0	13	1	2	1	2	20
<i>Chrotgonasoxyptheros</i> (Blanchard)	0	0	0	0	0	0	0	5	3	3	1	0	12
<i>Chrotgonastrachyptheros</i> (Blanchard)	4	0	0	0	0	0	0	3	1	0	0	0	8
<i>Colemaniasphenariodea</i> (I. Bolivar)	0	0	0	4	0	0	0	0	0	0	0	0	4
<i>Aularchesmiliarismiliaris</i> (Linnaeus)	0	0	0	0	6	0	0	0	0	0	0	0	6
<i>Pyrgomorphabispinosabispinosa</i> (Walker)	3	0	0	0	0	0	0	9	2	3	1	0	18
Total	07	00	00	05	06	00	00	30	07	08	03	02	
<b>Fam: Acrididae</b>													
<b>Sub fam: Acridinae</b>													
<i>Acridaexaltata</i> (Walker)	3	0	0	0	0	7	9	18	3	0	0	0	40
<i>Phlaeobapanteli</i> Bolivar	0	2	0	0	0	7	0	7	0	0	0	0	16
Total	03	02	00	00	00	14	09	25	03	00	00	00	
<b>Sub fam: Catantopinae</b>													
<i>Xenocatantopskarnyi</i> (Kirby)	0	0	0	6	13	0	0	0	0	0	0	0	19
<i>Diabolocatantopspinguisinnotabilies</i> (Walker)	0	2	11	0	0	0	1	1	4	3	2	3	27
<i>Xenocatantopshenryi</i> (I. Bolivar)	0	2	3	5	9	0	0	0	0	0	0	0	19
<i>Xenocatantopshumilis</i>	0	0	0	0	1	0	0	0	0	0	0	0	1
<i>Diabolocatantops</i> Sp.	0	0	0	0	0	0	0	0	0	0	0	2	2
Total	00	04	14	11	23	00	01	01	04	03	02	05	
<b>Sub fam: Coptacridinae</b>													
<i>Eucoptacrapraemorsa</i> (Stal)	10	5	2	4	5	4	2	8	4	13	11	14	82
Total	10	5	2	4	5	4	2	8	4	13	11	14	
<b>Sub fam: Cyrtacanthacridinae</b>													
<i>Cyrtacanthacristatrica</i> (Linnaeus)	0	0	0	0	0	1	1	6	2	1	0	0	11
<i>Pachyacrisvenosa</i> (Walker)	0	0	2	0	0	0	0	0	0	1	0	0	3
Total	00	00	02	00	00	01	01	06	02	02	00	00	
<b>Sub fam: Eyreprocnemidinae</b>													
<i>Eyreprocnemisalacrisalacris</i> (Serville)	6	2	1	4	7	2	5	3	1	0	0	0	31
Total	06	02	01	04	07	02	05	03	01	00	00	00	
<b>Sub fam: Gomphocerinae</b>													
<i>Aulacobothrus</i> sp.	11	1	1	0	3	0	0	0	0	0	0	0	16
<i>Aulacobothruslutipes</i> (Walker)	0	2	2	1	4	0	0	0	0	0	0	0	9
<i>Brachycrotaphuslongiceps</i> I. Boliver	5	5	4	2	4	3	3	9	6	5	3	8	57
Total	16	08	07	03	11	03	03	09	06	05	03	08	
<b>Sub fam: Hemiacridinae</b>													
<i>Parahieroglyphusbilineatus</i> (I. Boliver)	0	0	0	0	0	1	3	4	7	6	0	0	21
<i>Spathosternumprasiniiferum</i> (Walker)	5	1	8	4	15	18	21	33	31	27	21	6	190
Total	05	01	08	04	15	19	24	37	38	33	21	06	
<b>Sub fam: Oedipodinae</b>													
<i>Ailopusthalassinusthalassinus</i> (Fabricius)	0	6	0	0	0	0	0	0	0	0	0	0	6

Table 2 : Contd.....

Table 2: Contd.....

<i>Gastrimargasafricanasafricanas</i> Saussure	0	3	0	0	4	0	0	0	0	0	0	7
<i>Morphocrisfasciata</i> Kirby	0	0	0	0	0	0	4	0	3	0	0	7
<i>Trilophidiaannulata</i> (Thunberg)	0	2	2	0	0	3	6	27	11	13	10	77
Total	00	11	02	00	04	03	10	27	14	13	10	03
<b>Sub fam: Oxyinae</b>												
<i>Oxyahylahyla</i> Serville	0	0	0	0	2	4	12	0	2	1	1	22
Total	0	0	0	0	2	4	12	0	2	1	1	0
<b>Sub fam: Tropidopolinae</b>												
<i>Tristriapulvinata</i> (Uvarov)	0	0	0	0	2	0	0	1	0	0	0	3
Total	0	0	0	0	2	0	0	1	0	0	0	0
Total of acrididae	40	33	36	26	29	50	67	117	74	70	48	36
Grand total (Acrididae + Pyrgomorphidae)	47	33	36	31	75	50	67	147	81	78	51	38

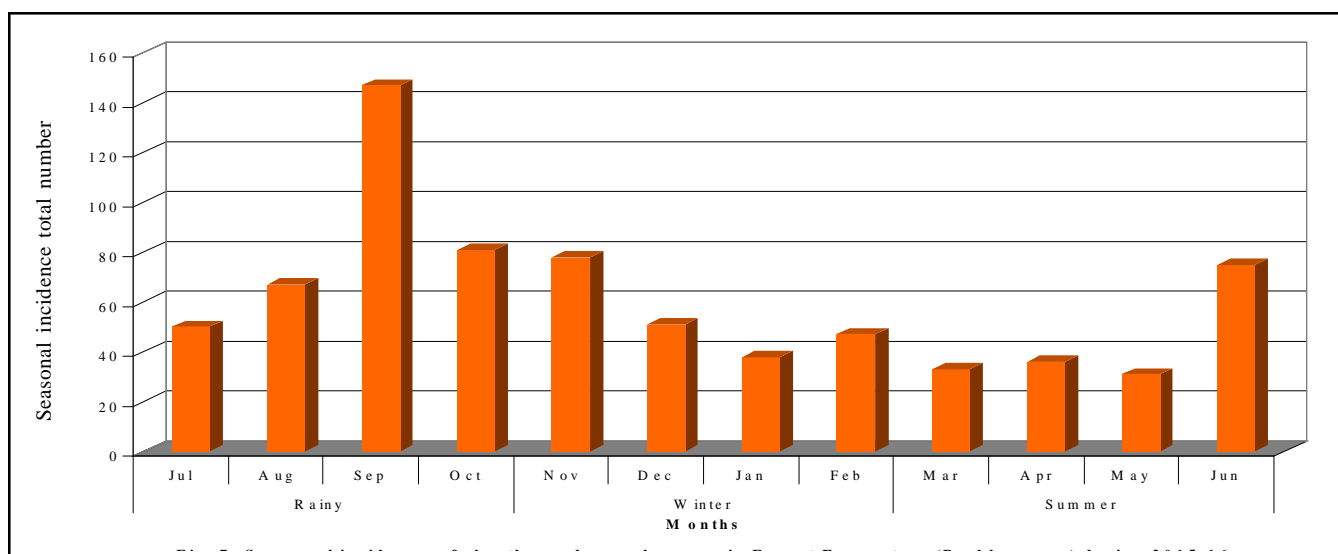


Fig. 2 : Seasonal incidence of shorthorned grasshoppers in forest ecosystem (Prabhunagar) during 2015-16

June. These findings are in line with the findings of Vastrad (1986).

Authors' affiliations :

**A.S. VASTRAD AND B. THIRUPAM REDDY**, Department of Agricultural Entomology, University of Agricultural Sciences, DHARWAD (KARNATAKA) INDIA

**V. RATNAKAR**, Department of Entomology, Professor Jayashankar Telangana State Agricultural University, Rajendranagar, HYDERABAD (TELANGANA) INDIA

**V. SUNIL**, Division of Entomology, IIRR, Rajendranagar, HYDERABAD (TELANGANA) INDIA

## REFERENCES

**Akhtar, M. H.**, Usmani, M. K. and Nayeem M. R. and Hirdesh, K. (2012). Species diversity and abundance of grasshopper

fauna (Orthoptera) in rice ecosystem. *Annl. Biol. Res.*, **3** (5): 2190-2193.

**Akhtar, M.H.**, Nayeem, M.R. and Usmani, M.H. (2014). Abundance, distribution and taxonomic studies on hemiacrididae (Acrididae: Acridoidea: Orthoptera) in Uttar Pradesh, India. *J. Global Biosciences*, **3** (6): 48-52.

**Vastrad, A.S.** (1986). Ecological studies on grasshoppers (Orthoptera: Acridoidea) fauna of Dharwad region, India. M. Sc. (Ag.). Thesis, University of Agricultural Sciences, Dharwad, KARNATAKA (INDIA).

**Vastrad, A. S.**, Rai, P. S. and Kulkarni, K. A. (1988). Occurrence of *Eucoptacraceylonica* Kirby (Coptacridinae: Acridinae: Orthoptera) in India. *Entomon*, **14** (3 & 4): 277-279.

**Vastrad, A.S.**, Lingappa, S. and Kulkarni, K.A. (1989).

Grasshoppers (Orthoptera: Acridoidea) of Dharwad Region and their hosts. *Karnataka J. Agric. Sci.*, **2** (12): 68-75.

**Vastrad, A.S.**, Rai, P.S. and Lingappa, S. (1991). Ecological distribution, life forms and food habits of grasshoppers (Orthoptera: Acridoidea) in Dharwad region, Karnataka.

*Hexapoda.*,**3** (2): 94-99.

**Vastrad, A.S.** (1994). Morphometrics of life forms of grasshoppers (Acridoidea :Orthoptera). *Karnataka J. Agric. Sci.*, **7** (2): 174-177.

12<sup>th</sup>  
Year  
of Excellence  
★★★★★