Int.J.Curr.Microbiol.App.Sci (2018) *7*(7): 409-420

International Journal of Current Microbiology and Applied Sciences
ISSN: 2319-7706 **Volume 7 Number 07 (2018)**
Journal homepage: http://www.ijcmas.com

Original Research Article https://doi.org/10.20546/ijcmas.2018.707.050

Pictorial Checklist of Agrobiont Spiders of Navsari Agricultural University, Navsari, Gujarat, India

J.N. Prajapati*, S.R. Patel and P.M. Surani

[1]*Department of Agricultural Entomology, N.M.C.A, NAU, Navsari, India*

**Corresponding author*

Keywords

Pictorial checklist, Agrobiont spiders, Navsari, biodiversity

Article Info

Accepted:
04 June 2018
Available Online:
10 July 2018

A B S T R A C T

A study on biodiversity of agrobiont spiders was carried out at N. M. College of Agriculture, Navsari Agricultural University (NAU) campus Navsari, Gujarat, India. A total 48 species of agrobiont spiders were recorded belonging to 34 genera and 12 families from different ecosystems *i.e.*, paddy, sugarcane, maize, mango and banana. Among them 33.33 per cent species belongs to family Araneidae, 29.17 per cent from Salticidae, 8.33 per cent species belongs to family Oxyopidae, 6.25 per cent species belongs to family Clubionidae, 4.17 per cent species belongs to Tetragnathidae, Sparassidae as well as Theridiidae of each, whereas remaining 2.08 per cent species from Thomisidae, Uloboridae, Lycosidae, Hersiliidae, and Scytodidae of each and prepared the pictorial checklist of 48 species of agrobiont spiders.

Introduction

Spiders are one of the most fascinating and diverse group of invertebrate animals on the earth. The population densities and species abundance of spider communities in agricultural fields can be as high as in natural ecosystems (Turnbull, 1973; Riechert, 1981 and Tanaka, 1989). Worldwide 45,557 spider species described (Uniyal *et al.*, 2011) and are estimated to number 60,000-170,000 species (Coddington and Levi, 1991). In numbers, 1686 species of 438 genera belongs to 60 families are recorded from India (Keswani *et al.*, 2012). Total 415 species belong to 169 genera of 40 families are recorded from Gujarat state (Yadav *et al.*, 2017). Spiders are considered to be of economic value to farmers as they play valuable role in pest management by consuming large number of prey in the agriculture fields without any damage to crops. To fill up the gaps in knowledge about different species of agrobiont spiders with their photographic catalogue in NAU campus, the present study was done.

Materials and Methods

The study was carried out at N. M. College of Agriculture, Navsari Agricultural University (NAU) campus Navsari, Gujarat, India from January 2017 to December 2017 under different agroecosystems. The ecosystems that are likely to support the spiders in the study

area such as paddy, sugarcane, maize, mango and banana ecosystems were searched for agrobiont spiders. When a spider was located, it was photographed and collected by the hand picking method suggested by Tikader (1987). The identification of spiders was done with the help of Tikader (1977, 1980, 1982, 1987), Tikader and Biswas (1981) and Sebastian and Peter (2009). The taxonomy and nomenclature followed is as per the world spider catalogue by Platnick (2014). The pictorial checklist is a useful tool for the identification of agrobiont spiders in the state. Therefore, close up photographs of species and their behavioural patterns were captured with the help of digital camera. Live specimens from the field conditions were photographed, so that natural colouration and specific behavioural postures can be documented. When we have no camera, the spiders were collected and preserved and photographs of such preserved spiders were captured for documentation purpose in form of photographic catalogue. The picture of small spiders was taken by dissecting stereo-trinocular microscope having SCAPE software.

Results and Discussion

During the present study a total of 48 species of agrobiont spiders were recorded from different locations, belonging to 12 families. Among them 33.33 per cent species belonged to family Araneidae, 29.17 per cent from Salticidae, 8.33 per cent species belonged to family Oxyopidae, 6.25 per cent species belonged to family Clubionidae, 4.17 per cent species belonged to Tetragnathidae, Sparassidae as well as Theridiidae of each, whereas remaining 2.08 per cent species from Thomisidae, Uloboridae, Lycosidae, Hersiliidae and Scytodidae of each (Table 1 and Fig. 1). Ambily and Antony (2016) reported total 40 species of spiders belonging to 14 families from Kerala. Among all families, Araneidae was most dominant family followed by Salticidae.

Table.1 Species distribution of agrobiont spiders of different families in NAU campus

Sr. No.	Family	Genera	No. of Species	% Species
1.	Araneidae	7	16	33.33
2.	Salticidae	14	14	29.17
3.	Oxyopidae	1	4	8.33
4.	Clubionidae	2	3	6.25
5.	Tetragnathidae	1	2	4.17
6.	Sparassidae	2	2	4.17
7.	Theridiidae	2	2	4.17
8.	Thomisidae	1	1	2.08
9.	Uloboridae	1	1	2.08
10.	Lycosidae	1	1	2.08
11.	Hersiliidae	1	1	2.08
12.	Scytodidae	1	1	2.08
Total		34	48	100

Table.2 Pictorial checklist of agrobiont spiders of NAU campus

Sr. No.	Spider species	Habitat
I. Family: Araneidae		
1.	*Argiope anasuja* (Thorell, 1887) (Image 1)	Paddy ecosystem, Sugarcane ecosystem, Maize ecosystem, Banana ecosystem, Garden, Wall of buildings
2.	*Argiope pulchella* (Thorell, 1881) (Image 2)	Paddy ecosystem, Maize ecosystem, Banana ecosystem, Garden
3.	*Argiope sp.* (Image 3)	Paddy ecosystem, Banana ecosystem, Garden
4.	*Argiope aemula* (Walckenaer, 1841) (Image 4)	Paddy ecosystem, Garden
5.	*Neoscona mukerjei* (Tikader, 1980) (Image 5)	Paddy ecosystem, Sugarcane ecosystem, Maize ecosystem, Mango ecosystem, Banana ecosystem, Dense area, Vegetable crops
6.	*Neoscona theisi* (Walckenaer, 1842) (Image 6)	Paddy ecosystem, Sugarcane ecosystem, Maize ecosystem, Mango ecosystem, Banana ecosystem, Vegetable crops
7.	*Neoscona bengalensis* (Tikader and Bal, 1981) (Image 7)	Paddy ecosystem, Mango ecosystem, Banana ecosystem, Arjun, Garden
8.	*Neoscona vigilans* (Blackwall, 1865) (Image 8)	Paddy ecosystem, Sugarcane ecosystem, Garden
9.	*Neoscona* sp.1 (Image 9)	Paddy ecosystem, Sugarcane ecosystem, Maize ecosystem, Garden, Vegetable crops
10.	*Neoscona* sp.2 (Image 10)	Paddy ecosystem, Maize ecosystem, Mango ecosystem, Cruciferous crops, Garden
11.	*Pasilobus* sp. (Image 11)	Paddy ecosystem, Sugarcane ecosystem, Garden
12.	*Cyclosa confraga* (Thorell, 1892) (Image 12)	Paddy ecosystem, Maize ecosystem, Mango ecosystem, Banana ecosystem, Vegetable crops
13.	*Cyclosa* sp. (Image 13)	Paddy ecosystem, Maize ecosystem, Garden
14.	*Cyrtophora cicatrosa* (Stoliczka, 1869) (Image 14)	Paddy ecosystem, Sugarcane ecosystem, Banana ecosystem, Garden
15.	*Eriovixia* sp. (Image 15)	Mango ecosystem, Banana ecosystem, Garden, Fruit trees
16.	*Larinia* sp. (Image 16)	Paddy ecosystem, Sugarcane ecosystem, Maize ecosystem, Wall of buildings,

		Garden
II. Family: Salticidae		
17.	*Carrhotus viduus* (Koch, C. L., 1846) (Image 17)	Paddy ecosystem, Sugarcane ecosystem, Maize ecosystem, Mango ecosystem, Banana ecosystem, Wall of buildings
18.	*Epeus indicus* (Proszynski, 1992) (Image 18)	Maize ecosystem, Broad leaves crops
19.	*Plexippus paykulli* (Audouin, 1826) (Image 19)	Mango ecosystem, Banana ecosystem, Walls of buildings, Bark of trees
20.	*Phintella vittata* (Koch, C. L., 1846) (Image 20)	Sugarcane ecosystem, Maize ecosystem, Banana ecosystem, Papaya, Marigold
21.	*Chrysilla volupe* (Karsch, 1879) (Image 21)	Paddy ecosystem, Sugarcane ecosystem, Maize ecosystem, Banana ecosystem, Grasses, Marigold
22.	Unknown sp.1 (Salticidae) (Image 22)	Banana ecosystem, Walls of buildings, Dry grasses
23.	*Pristobaeus sp.* (Image 23)	Sugarcane ecosystem, Banana ecosystem, Dry grasses
24.	*Evarcha falcate* (Clerck, 1757) (Image 24)	Sugarcane ecosystem, Walls of buildings
25.	Unknown sp.2 (Salticidae) (Image 25)	Paddy ecosystem, Sugarcane ecosystem, Garden
26.	*Cosmophasis* sp. (Image 26)	Banana ecosystem, Walls of buildings
27.	*Telamonia dimidiata* (Simon, 1899) (Image 27)	Sugarcane ecosystem, Maize ecosystem, Cotton, Mulberry
28.	*Menemerus bivittatus (Dufour, 1831)* (Image 28)	Mango ecosystem, Banana ecosystem, Walls of buildings
29.	*Siler* sp. (Image 29)	Maize ecosystem, Garden
30.	*Rhene* sp. (Image 30)	Paddy ecosystem, Jasmine
III. Family: Oxyopidae		
31.	*Oxyopes javanus* (Thorell, 1887) (Image 31)	Paddy ecosystem, Sugarcane ecosystem, Maize ecosystem, Mango ecosystem, Banana ecosystem, Marigold, Garden
32.	*Oxyopes sunandae* (Tikader, 1970) (Image 32)	Paddy ecosystem, Sugarcane ecosystem, Maize ecosystem, Marigold
33.	*Oxyopes* sp. (Image 33)	Paddy ecosystem, Sugarcane ecosystem, Maize ecosystem, Banana ecosystem, Cotton, Garden
34.	*Oxyopes birmanicus* (Thorell, 1887) (Image 34)	Paddy ecosystem, Sugarcane ecosystem, Maize ecosystem, Marigold
IV. Family: Clubionidae		

35.	*Clubiona* sp. (Image 35)	Paddy ecosystem, Sugarcane ecosystem, Maize ecosystem, Banana ecosystem, Rolled leaves
36.	*Clubiona drassodes* (Cambridge, O. P., 1874) (Image 36)	Paddy ecosystem, Sugarcane ecosystem, Maize ecosystem, Banana ecosystem, Rolled leaves
37.	*Cheiracanthium punctorium* (Image 37)	Paddy ecosystem, Banana ecosystem, Rolled leaves, Garden
V. Family: Tetragnathidae		
38.	*Tetragnatha mandibulata* (Walckenaer, 1842) (Image 38)	Paddy ecosystem, Near vicinity of water
39.	*Tetragnatha* sp. (Image 39)	Paddy ecosystem, Near vicinity of water
VI. Family: Sparassidae		
40.	*Heteropoda venatoria* (Linnaeus, 1767) (Image 40)	Paddy ecosystem, Sugarcane ecosystem, Maize ecosystem, Anthurium, Fruit boxes, Houses, Warm places
41.	*Olios sp.* (Image 41)	Paddy ecosystem, Maize ecosystem, Warm places, Houses
VII. Family: Theridiidae		
42.	*Theridion* sp. (Image 42)	Sugarcane ecosystem, Maize ecosystem, Garden
43.	*Steatoda sp.* (Image 43)	Mango ecosystem, Banana ecosystem, Gerbera, Marigold
VIII. Family: Thomisidae		
44.	*Thomisus* sp. (Image 44)	Paddy ecosystem, Sugarcane ecosystem, Maize ecosystem, Marigold, Gerbera
IX. Family: Uloboridae		
45.	*Uloborus plumipes* (Lucas, 1846) (Image 45)	Mango ecosystem, Banana ecosystem, Gerbera
X. Family: Lycosidae		
46.	*Lycosa* sp. (Image 46)	Paddy ecosystem, Wet land
XI. Family: Hersiliidae		
47.	*Hersilia savignyi* (Lucas, 1836) (Image 47)	Mango ecosystem, Tree-trunks
XII. Family: Scytodidae		
48.	*Scytodes thoricica* (Latreille, 1802) (Image 48)	Paddy ecosystem, Sugarcane ecosystem, Maize ecosystem, Marigold, Jasmine, Stones on ground

Fig.1 Distribution of different families in Araneae Order

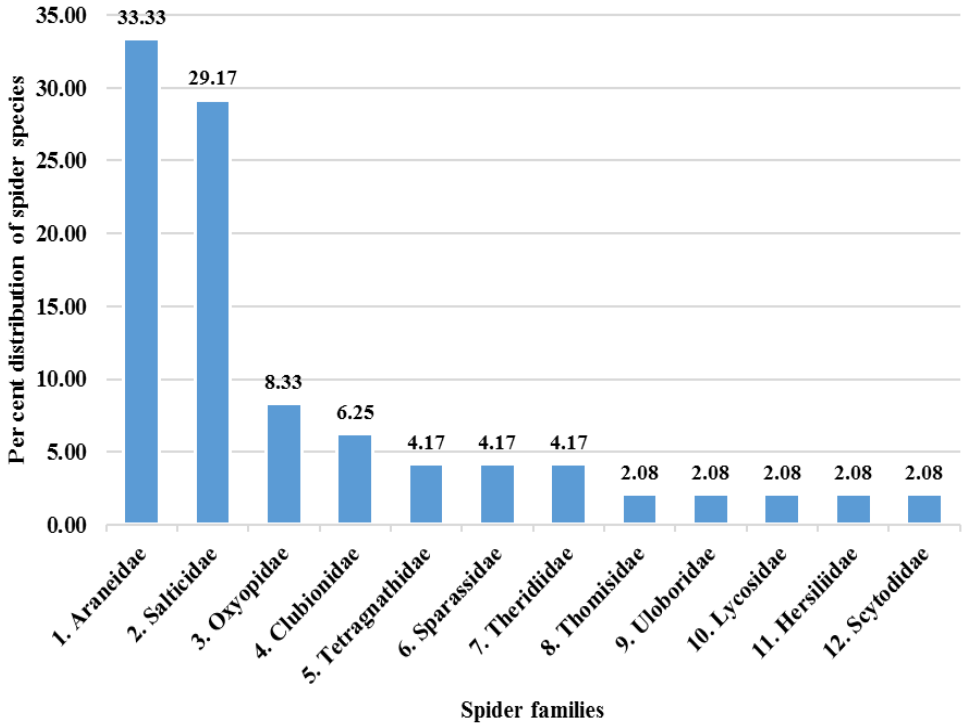

Image: 1

Image: 2

Image: 3

Image: 4

Image: 5

Image: 6

		
Image: 7	**Image: 8**	**Image: 9**
		
Image: 10	**Image: 11**	**Image: 12**
		
Image: 13	**Image: 14**	**Image: 15**
		
Image: 16	**Image: 17**	**Image: 18**

 **Image: 19**	 **Image: 20**	 **Image: 21**
 **Image: 22**	 **Image: 23**	 **Image: 24**
 **Image: 25**	 **Image: 26**	 **Image: 27**
 **Image: 28**	 **Image: 29**	 **Image: 30**

		
Image: 31	**Image: 32**	**Image: 33**
		
Image: 34	**Image: 35**	**Image: 36**
		
Image: 37	**Image: 38**	**Image: 39**
		
Image: 40	**Image: 41**	**Image: 42**

Image: 43

Image: 44

Image: 45

Image: 46

Image: 47

Image: 48

Under the present study Araneidae was the most dominant family comprising of seven genera and 16 species with 33.33 per cent species distribution. This may be more or less in accordance with the earlier work. Further, More (2015) from Maharashtra also recorded Araneidae as one of the most dominant family, thus closely support the present findings. In the present investigation, a total of 48 species of agrobiont spiders in 34 genera belonging to 12 families were recorded and the pictorial checklist of different agrobiont spiders from the study area was prepared (Table 2).

The checklist of the Araneae of different countries/continents/ecozones were published in recent past by several authors, like Gajbe (2003), Dandria *et al.,* (2005), Siliwal *et al.*, (2005), Namkung *et al.*, (2009), Ursani and Soomro (2010), Khan (2011), Perveen and Jamal (2012), Sial *et al.*, (2012), Adarsh and Nameer (2015), Lawania and Trigunayat (2015), Perveen and Khan (2015), Adarsh and Nameer (2016), Ghazanfar *et al.,* (2016) and Prajapati *et al.,* (2016). The present compilation was also more or less similar in accordance with the earlier checklist, as most of the families and species were found in these checklist. In the present study the spider families Araneidae, Salticidae, Oxyopidae, Clubionidae, Tetragnathidae, Sparassidae and Theridiidae were commonly found in Navsari Agricultural University.

In conclusion, the pictorial checklist of total 48 species of agrobiont spiders were recorded which belongs to 34 genera and 12 families from different habitats with their taxonomic position.

Acknowledgement

The authors are thankful to Prof. Ramesh Thumar, Assistant Professor, Department of Zoology, B. P. Baria Science College,

Navsari, Gujarat for identifying spider species and valuable suggestions.

References

Adarsh, C. K. and Nameer, P. O. (2015). Spiders of Kerala Agricultural University Campus, Thrissur, Kerala, India. *Journal of Threatened Taxa*, 7(15): 8288-8295.

Adarsh, C. K. and Nameer, P. O. (2016). A preliminary checklist of spiders (Araneae: Arachnida) in Chinnar Wildlife Sanctuary, Western Ghats, India. *Journal of Threatened Taxa*, 8(4): 8703–8713.

Ambily, C. B. and Antony, A. (2016). Diversity and distribution of spiders in agro ecosystem of Ernakulum District, Kerala. *The Journal of Zoology Studies*, 3(5): 73-77.

Coddington, J. A. and Levi, H. W. (1991). Systematics and evolution of spiders (Araneae). *Annual Review of Ecology and Systematics*, 22: 565-592.

Dandria, D., Falzon, V. and Henwood, J. (2005). The current knowledge of the spider fauna of the Maltese Islands with the addition of some new records (Arachnida: Araneae). *The Central Mediterranean Naturalist*, 4(2): 121-129.

Gabje, P. (2003). Checklist of spiders (Arachnida: Araneae) of Madhya Pradesh and Chhattisgarh. *Zoos' Print Journal*, 18(10): 1223-1226.

Ghazanfar, M., Hussain, M., Hashim, M. and Mustafa fahid, A. U. (2016). Check list of spider (Araneae) fauna of Pakistan: A review. *Journal of Entomology and Zoology Studies*, 4(1): 245-256.

Keswani, S., Hadole, P. and Rajoria, A. (2012). Check list of Spiders (Arachnida: Araneae) from India, *Indian Journal of Arachnology*, 1(1): 1-129.

Khan, A. A. (2011). Spider fauna (Arachnida: Araneae) in Horticultural ecosystem of Kashmir. *Animal Diversity, Natural History and Conservation*, 1: 313-338.

Lawania, K. K. and Trigunayat, M. M. (2015). A comparative study of the spider (Araneae) fauna in Keoladeo National Park (KNP), Nahargarh Wildlife Sanctuary (NWS) and Sur-Sarovar Bird Sanctuary (SBS), India. *Mun. Ent. Zool.*, 10(2): 435-440.

More S. B. (2015). Inventorization of spider diversity from Vakoba, Devrai region of Radhanagari Wildlife Sanctuary. *International Journal of Science and Research*, 4(6): 179-181.

Namkung, J., Yoo, J. S., Lee, S. Y., Lee, J. H., Paek, W. K. and Kim, S. T. (2009). Bibliographic check list of Korean spiders (Arachnida: Araneae) ver. 2010. *Journal of Korean Nature*, 2(3): 191-285.

Perveen, F. and Jamal, A. (2012). Checklist of spider fauna of FR Peshawar, FATA, Pakistan. *Arthropods*, 1(1): 35-39.

Perveen, F. and Khan, N. (2015). Checklist of the first recorded spider fauna in Sheringal, Khyber Pakhtunkhwa, Pakistan. *Advances in Entomology*, 3: 94-100.

Platnick, N. I. (2014). The world spider catalog, Version 15.0. American Museum of Natural History http://research.amnh.org/entomology/spiders/catalog/index. Accessed on 25 January 2017.

Prajapati, D. A., Patel, K. R., Munjpara, S. B., Chettiar, S. S. and Jhala, D. D. (2016). Spiders (Arachnida: Araneae) of Gujarat University Campus, Ahmedabad, India with additional description of *Eilica tikaderi* (Platnick, 1976). *Journal of Threatened Taxa*, 8(11): 9327-9333.

Riechert, S. E. (1981). The consequences of

being territorial: Spiders, a case study. *American Naturalist*, 117: 871-892.

Sebastian, P. A. and Peter, K. V. (2009). *Spiders of India*. Universities Press (India) Private Limited, Hyderabad, 614 pp.

Sial, N., Ruby, T., Malik, S. and Mushtaq, S. (2012). A checklist of the spiders of Cholistan and neighbouring areas. *Pak. J. Agri. Sci.*, 49(3): 335-338.

Siliwal, S., Molur, S. and Biswas, B. K. (2005). Indian spiders (Arachnida: Araneae): Updated Checklist 2005. *Zoos' Print Journal*, 20(10): 1999-2049.

Tanaka, K. (1989). Movement of the spiders in arable land. *Plant Protection*, 43(1): 34-39.

Tikader, B. K. (1977). Studies on spider fauna of Andaman and Nicobar Islands India Ocean. *Records of the Zoological Survey of India*, 72: 153-212.

Tikader, B. K. (1980). *Fauna of India - Araneae: Spiders*, Vol. I (Araneidae and Gnaphosidae). Zoological Survey of India, 448 pp.

Tikader, B. K. (1982). *Fauna of India - Araneae: Spiders*, Vol. II (Thomisidae and Lycosidae). Zoological Survey of India, 533 pp.

Tikader, B. K. (1987). Hand book of Indian Spiders. Zoological Survey of India, 251 pp.

Tikader, B. K. and Biswas, B. (1981). *Spider Fauna of Calcutta and Vicinity*. Zoological survey of India, Kolkata, 149 pp.

Turnbull, A. L. (1973). Ecology of the true spiders (Araneomorphae). *Annual Review of Entomology*, 18: 305-348.

Uniyal, V. P., Sivakumar, K. and Quasin, S., (2011). Diversity of Spiders in Nanda Devi Biosphere Reserve. Wildlife Institute of India, Dehradun. (DST Project Completion Report).

Ursani, T. J. and Soomro, N. M. (2010). Check-list of spider fauna of Sindh Province, Pakistan. *Pakistan Entomologist*, 32(1): 18-23.

Yadav, A., Solanki, R., Siliwal, M. and Kumar, D. (2017). Spiders of Gujarat: a preliminary checklist. *Journal of Threatened Taxa*, 9(9): 10697-10716.

How to cite this article:

Prajapati, J.N., S.R. Patel and Surani, P.M. 2018. Pictorial Checklist of Agrobiont Spiders of Navsari Agricultural University, Navsari, Gujarat, India. *Int.J.Curr.Microbiol.App.Sci.* 7(07): 409-420. doi: https://doi.org/10.20546/ijcmas.2018.707.050