

Species Composition and Monthly Variation of Spiders in the Rice Fields, Yangon Region

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Abstract

The collection of the spider specimens was undertaken from the rice fields of Dagon International Ltd., No. (1), special agriculture zone, East Dagon Township, Yangon Region. A total of 41 species under 22 genera belonging to eight families from one order was recorded from the rice fields. The highest species number 10 species(24%) was collected from the family Tetragnathidae which was followed by Araneidae eight species (20%). Only one species was observed from the family Clubionidae. Maximum individual numbers (420 individuals) collected in February and minimum individual number (108) in June. Throughout the study period, *Hippasa holmerae* was observed in highest individual numbers while *Oxyopes salticus* in lowest number. According to dominance index, one species was assessed as abundant category, four species as common category, another four species as frequent category, seven species as uncommon category and 25 species as rare category. Only one species *Hippasa holmerae* was abundant in the paddy fields.

Key words : spiders, rice fields

Introduction

A rice field is a complex agroecosystem, containing many aquatic, semiaquatic, and terrestrial species (Michael *et al.*, 1988). Rice is grown during the monsoon (80%) and summer seasons (20%) in four growing zones: the delta, dry zone, coastal zone, and mountain areas. The monsoon rice is sown in May to October and summer rice in November to March (Ricepedia, 2015). Rice crop is attacked by many insect pests and diseases. Green planthopper and Brown planthopper are considered the most important pests in rice and their populations were unstable in irrigated rice fields. Spiders are the most abundance group of predators in any agroecosystem, especially in rice fields. They may play an important role as stabilizing agents and regulators of insect populations in agroecosystem, forest ecosystem, and other terrestrial ecosystems. The use of chemical insecticides may remove the general predators and damage this rich ecosystem. Most of the spiders in rice fields seem to evacuate the field after the application of insecticides and more back into the field later (Barrion and Litsinger,1995). Researches in the rice fields are still rare in Myanmar. Hence, the present study was carried out for the rice fields with the following objectives:

- to record the occurrence of spider in study site
- to observe the species composition
- to assess the monthly variation
- to categorize the dominance index

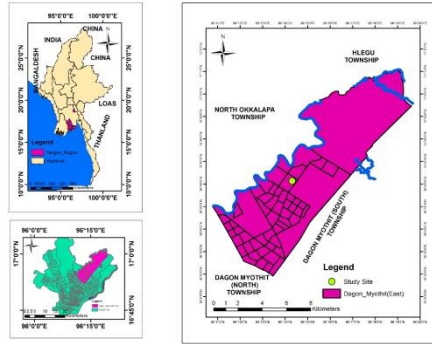
Materials and Methods

The study area is situated between Latitude 16°56'14.77"N and Longitude 96°14' 18.8"E. The study period lasted from December, 2017 to August, 2018. Five plots (each 0.8 hectare) were chosen for specimen collection. Sampling plots were set in one each corner and center of the plot. During the study period, twice a week was collected and survey time was between 7:00 am to 10:00 am during study day. The collection of spiders was conducted by visual counting, sucking and sweeping. Fresh specimens of spiders were immediately

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photographed and then preserved separately in 75% ethyl alcohol. The collected specimens were identified followed after Pocock (1900), Levi (1900), Koh (2001) and Barrion and Litsinger (1995). Analysis of dominance index was done according to the method of Kumar (2001).

$$\text{Dominance index} = \frac{\text{Number of individual s of each species}}{\text{Total number of individual s of all species}} \times 100$$



(Source: Geography Department,2018)

Fig.1 Map of Dagon Township showing study site

Results

A total of 41 species belonging to 22 genera and eight families was recorded from the rice fields during the study period (Table 1). Among the recorded spider species, the family Tetragnathidae was the highest species number (10 species, 24%) and the family Clubionidae was the lowest species number (1 species, 2%) (Fig 1). In the study area, the maximum number of 420 individuals in February and minimum number 108 in June (Fig 2). *Hippasa holmerae* was observed in all month with highest individual numbers while *Oxyopes salticus* was observed in all months with lowest number. According to dominance index, one species was assessed as abundant category, four species as common category, another four species as frequent category, seven species as uncommon category and 25 species as rare category. Only one species *Hippasa holmerae* was abundant in the paddy fields.



A. *Argiope catenulate* (Female)



B. *Argiope catenulate* (Male)



C. *Hippasa holmerae* (Female)



D. *Pardosa pseudoannulata* (Female)



E. *Oxyopes birmanicus* (Female)



F. *Oxyopes javanus* (Female)



G. *Oxyopes salticus* (Male)



H. *Burmattus pococki* (Male)



I. *Plexippus petersi* (Male)



J. *Tetragnatha caudate* (Female)



K. *Tetragnatha mandibulata* (Male)



L. *Tetragnatha pallescens* (Female)



M. *Argyrodes argentatus* (Female)



N. *Enoplognatha ovata* (Female)



O. *Runcinia acuminata* (Female)

Plate 1. Some recorded spider species in the study site

Family	No.	Scientific Name	Common Name
Araneidae	1	<i>Araneus inustus</i> (L. Koch, 1871)	Dotted orb-weaver
	2	<i>Argiope aemula</i> (Walcknaer, 1841)	Oval cross spider
	3	<i>A. catenulata</i> Doleshall, 1859	Grass cross spider
	4	<i>Gea heptagon</i> (Hentz, 1850)	Heptagonal orb weaver
	5	<i>G. spinipes</i> C. L. Koch, 1843	None
	6	<i>Larinia directa</i> (Hentz, 1847)	Orb weaver
	7	<i>Neoscona elliptica</i> Tikader & Bal, 1981	Smooth sphere araneid
	8	<i>N. punctigera</i> (Doleschall, 1857)	Monkey spider
Clubionidae	9	<i>Clubiona terrestris</i> Westring, 1851	Sac spider
Lycosidae	10	<i>Hippasa holmerae</i> Thorell, 1895	Lawn wolf spider
	11	<i>Lycosa pseudoannula</i> (Boesenberg & Strand, 1906)	Wolf spider
	12	<i>Pardosa agrestis</i> (Westring, 1861)	Field wolf spider
	13	<i>P. amentata</i> (Clerk, 1757)	Spotted wolf spider
	14	<i>P. birmanica</i> Simon, 1884	Dark wolf spider
	15	<i>P. pseudoannulata</i> (Boesenberg & Strand, 1906)	Pond wolf spider
	16	<i>P. sumatrana</i> (Thorell, 1890)	Common grass spider
	Oxyopidae	17	<i>Oxyopes birmanicus</i> Thorell, 1887
18		<i>O. javanus</i> Thorell, 1887	Lynx spider
19		<i>O. lineatipes</i> (C. L. Koch, 1847)	Garden lynx spider
20		<i>O. salticus</i> (Hentz, 1845)	Striped lynx spider

Table 1 Recorded spider species in the study area

Table.1 Continued

Family	No.	Scientific Name	Common Name
Salticidae	21	<i>Bianor hotingchiehi</i> Schenkel, 1963	None
	22	<i>Burmattus pococki</i> (Thorell, 1895)	None
	23	<i>Carrhotus viduus</i> (C. L. Koch, 1846)	Doubled striped jumper
	24	<i>Plexippus paykulli</i> Audouin, 1826	Pantropical jumper
	25	<i>P. petersi</i> (Karsch, 1878)	Common housefly catcher
	26	<i>Simaetha tenuior</i> (Keyserling, 1882)	None
Tetragnathidae	27	<i>Leucauge dorsotuberculata</i> Tikader, 1982	Long-jawed orb weaver
	28	<i>Tetragnatha caudata</i> Emerton, 1884	Stick spider
	29	<i>T. elongata</i> Walcknaer, 1841	Stretch spider
	30	<i>T. extensa</i> (Linnaeus, 1758)	None
	31	<i>T. mandibulata</i> Walcknaer, 1842	Big-jawed spider
	32	<i>T. maxillosa</i> Thorell, 1859	Long-jawed spider
	33	<i>T. nitens</i> Audouin, 1826	Long-jawed spider
	34	<i>T. pallescens</i> F.O Pickard-Cambridge, 1903	None
	35	<i>T. straminea</i> Emerton, 1884	None
	36	<i>Tylorida striata</i> (Thorell, 1877)	Striated spider
Theridiidae	37	<i>Argyrodes argentatus</i> O-Pickard-Cambridge, 1833	Silver comb-footed spider
	38	<i>Enoplognatha ovata</i> Sundevall, 1833	Tangle web spider
	39	<i>Theridion varians</i> Hann, 1833	None
Thomisidae	40	<i>Runcinia acuminata</i> (Thorell, 1881)	Pointy crab spider
	41	<i>R. albostrciata</i> Boesenberg and Strand, 1906	Brown crab spider

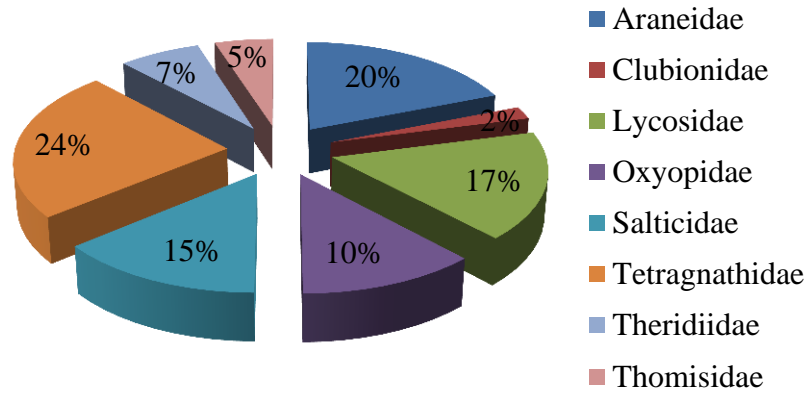


Fig. 2 Species composition of recorded spider in relation with respective family

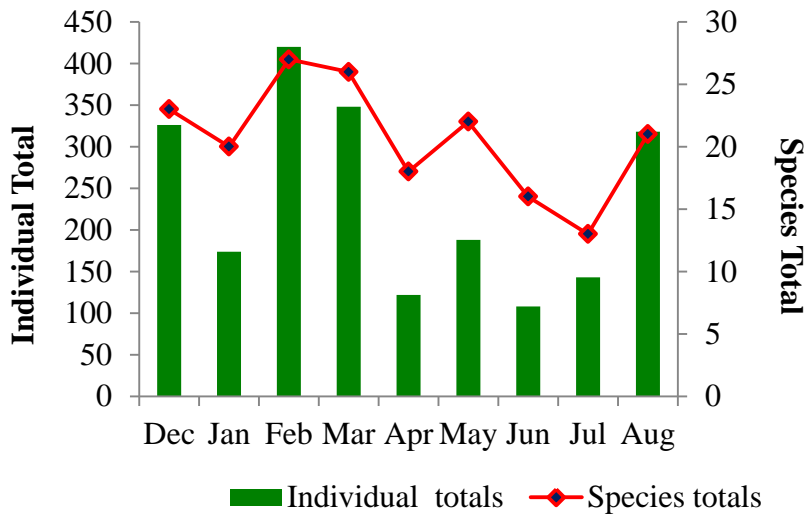


Fig. 3 Monthly abundance of spider species in the study area

DISCUSSION AND CONCLUSION

Result show the families Tetragnathidae and Araneidae were the dominant families. The largest taxonomic family is Tetragnathidae. In Tetragnathidae, one genus and eight species namely *Tetragnatha caudata*, *T. elongata*, *T. extensa*, *T. mandibulata*, *T. maxillosa*, *T. nitens*, *T. pallescens* and *T. straminea* were recorded.

T. mandibulata was the predominant species recorded. It was the largest and robust among the different species and possessed an extra tooth. Araneidae was the second abundant family collected from the rice fields. These conspicuous creatures were brightly colored and made large webs between the plants. This present study agreed with Joseph and Premila (2016).

Spider's fauna was relatively poor in early period of rice growth. From the early period onwards, spider's fauna became rich with the invasion and population growth settlers. Among the settlers, the population growth of *Hippasa holmerae* was the most remarkable. *Pardosa pseudoannulata* was observed throughout the study period. This was agreed with Barrion (1992).

The largest number of individuals in February (27 species) and the smallest number of individuals in June (16 species). The spider population always shows fluctuation between the crop stages and pest populations. This may be due to the environmental factors and habitats were suitable for these spiders.

According to dominance index, only one species *Tetragnatha caudata* was common in rice fields. Other four species *Araneus inustus*, *Oxyopes salticus*, *Tetragnatha caudata* and *Enoplognatha ovata* were generally limited to the paddy margins. The one abundant paddy spider *Hippasa holmerae* is dominant in the rice fields.

In the present study, spiders are insectivorous, help to keep the population of insect. They are one of the most numerous groups of terrestrial predators. They are generalist predators, in their mode of action against pest. They can be used as natural insecticide in agroecosystem. Therefore the spiders were effective biocontrol agent in rice field ecosystem.

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