

## Diversity of Weeds and Arthropods in The Agricultural Fields of Usilampatti Taluk, Tamil Nadu, India



### Zoology

**KEYWORDS :** Arthropods, Weeds, Diversity, Usilampatti Taluk

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### ABSTRACT

*Biodiversity can be simply defined as the variety of all types of living organism. Weeds and arthropods are among the most diverse groups on earth, which received more attention in integrated pest management. Weeds and arthropods are playing a vital role in the agricultural ecosystem in addition with assisting the farmers. In our present study, arthropods and weeds were collected from rice field area of Usilampatti taluk, Madurai district, Tamil Nadu, India. The diversities were collected from September 2013 to February 2014, using hand reaping methods. By this diversity, the farmers can able to assist their integrated pest management strategy through the collected weeds and arthropods. Also this study helps them to propose a framework strategy which highly suited with the collected arthropods and weeds in order to achieve the sound integrated pest management through weeds associated arthropods.*

### Introduction

Changing climate and increasing soil infertility, pressures the farmers and agricultural experts to look after some new strategies in order to make the agriculture better in all terms of practices including increasing efficiency in productivity. Generally, for increasing yield and productivity farmers are used to practice with artificial pest management techniques, which pose the health of the soil and planted crop in a question. Hence, recent researchers are more focused on the integrated pest management (IPM) system, which is the natural way for dealing with pest including weeds and arthropods. Generally weeds and arthropods are having strong hands on the yield of any agricultural systems and many studies continuously reporting through literatures. On the other hand, weeds are the host for most of the pest, which help the crop to grow as effective. Hence, it is to practice the IPM with the assistance of weeds and arthropods. However, before interrogating with weeds and arthropods it is necessary to know the diversity of both species, then it will help for sound IPM, which furthermore improve productivity. In this concern, this study itself takes the responsibility to explore the diversity of weeds and arthropods in rice cultivation area on Usilampatti Taluk of Tamilnadu. However, rice is one of the essential crops in India, which is one of the most consumed crops in the world. Hence, this study considers rice cultivation field, and Usilampatti Taluk was chosen owing to that the previous ultimately fails to discuss these IPM areas in this particular region, with this connection, this study considers the diversity of weeds and arthropods in rice cultivation land on Usilampatti Taluk.

Remaining section of the paper are as follows. Section 2 details the materials and methods involved in the study including study area, period and sampling techniques. Section 3 furnishes the results and findings obtained through this study with the main focus of diversity of weeds and arthropods. Section 4 provides the conclusion of the study along with the limitation and future enhancements.

### Materials and Methods

This section was classified into three sub sections, namely study area, study period and sampling. The main aim of this section is to explore the pilot details of the study, however the description of each section was detailed below.

### Study area

The study area was located in Usilampatti taluk, Madurai district, Tamil Nadu, India. Srivilliputtur is located at 9.9651° N longitude and 77.7885° E altitude. This city is located 201 meter above sea level. Usilampatti belongs to Madurai District of Tamil Nadu State of India, with the total area of 1087 Sq. Km including three blocks and 87 villages. This is a warm, humid region and with the seasonal rainfall of 352.1 (31.41) mm from Southwest monsoon and 582.1 (51.94) mm from North east monsoon. Humidity is also showing seasonal fluctuation.

### Study period

The investigation was carried out for a period of six months from September 2013 to February 2014. Sampling was conducted in six months at the randomly selected rice field.

### Sampling

Sampling was done every month from quadrates. Arthropods were collected from 1 quadrates (1sq. m × 1sq.m) placed at four corners and one centre of 10 sq. m × 10 sq. m area by visual search method between 8.00 – 10 hours. A sufficient core area was left to avoid edge effects. All 1 quadrates were searched. Arthropods were collected from the ground stratum and from the terminals of plants.

Sampling time was restricted to 20 minutes in each transect, depending on the density of under storey weeds and shrubs to be walked through, and this included time spent on field to identify unfamiliar taxa encountered. The time taken to describe web characteristics (useful in identifying the family, and in some instances, up to the genus level) was excluded from the calculation of sampling time for each transect.

Attempts were made to carefully scan the leaf litter surface, tree bark, foliage twigs, and branches of the vegetation (up to 1.5m height) along transect. Specimens from each quadrate were preserved in 75% alcohol in the field and counted under a microscope in the laboratory. In addition, all weeds in each quadrate were identified, counted and recorded.

### Results

From the study, the diversity of arthropods and weeds are tabulated in Table 1 and Table 2 respectively.

**Table 1: Diversity of arthropods in selected cultivation field**

S. No	Order/Family	Species	Common Name
1	Pieridae	<i>Delias eucharis</i> Drury	Common Jezebel
2	Nymphalidae	<i>Hypolimnas misippus</i> L.,	Danaid eggfly
3	Nymphalidae	<i>Danaus chrysippus</i> L.,	Plain tiger
4	Papilionidae	<i>Papilio polytes</i> L.,	Common mor-mon
5	Papilionidae	<i>Pachliopta aristolochiae</i> Fabricius	Common rose
6	Papilionidae	<i>Pachliopta hector</i> Linnaeus	Crimson rose
7	Nymphalidae	<i>Acraea violae</i>	Tawny coster
8	Nymphalidae	<i>Ypthima asterope</i> Klug	Common threering
9	Pieridae	<i>Eurema hecabe</i> Linnaeus	Common Grass yellow
10	Hesperiidae	<i>Mycaelis perseus</i> Fabricius	Common bush brown
11	Hesperiidae	<i>Borbo cinnara</i> Wallace	Rice swift
12	Nymphalidae	<i>Junonia iphita</i> Cramer	Chocolate pansy
13	Pieridae	<i>Catopsilia pomona</i>	Lime Emigrant
14	Pieridae	<i>Catopsilia pyranthe</i> L.,	Mottled Emigrant
15	Pieridae	<i>Leptosia nina</i> Fabricius	Psyche
16	acanthaceae	<i>Junonia lemonias</i> Linnaeus	Lemon pansy
17	lycaenidae	<i>Jamides celeno aelianus</i> Fabricius	Common Cerulean
18	Nymphalidae	<i>Byblia ilithyia</i> Drury	Joker
19	Nymphalidae	<i>Ariadne ariadne</i> indica	Angled Castor
20	Nymphalidae	<i>Junonia almana almana</i> Linnaeus	Peacock Pansy
21	Papilionidae	<i>Melanitis leda leda</i> Drury	Common Evening-Brown
22	Papilionidae	<i>Papilio demoleus</i> Linnaeus	Lime Butterfly
23	Pieridae	<i>Colotis danae</i> Fabricius	Crimson Tip
24	Nymphalidae	<i>Junonia hierta hierta</i> Fabricius	Oriental Yellow Pansy
25	Arctiidae	<i>Amata bicinota</i>	Handmaiden moth
26	libellulidae	<i>Diplacodes trivialis</i>	Ground Skimmer
27	libellulidae	<i>Orthetrum sabina</i>	Green Marsh Hawk
28	Apidae	<i>Trigona</i> sp.	Stingless bee
29	Apidae	<i>Xylocopa</i> sp.	Carpenter bee
30	Vespidae	<i>Polistes</i> sp	Paper wasp
31	Coccinellidae	unidentified	Lady beetle
32	Oxyopidae	<i>Oxyopes similis</i>	Lynx spider

**Table 2: Diversity of Weeds in selected cultivation field**

S. No	Family	Scientific Name	Common Name	Grasses	Broad leaved weed	Sedges
1	Acanthaceae	<i>Hygrophila auriculata</i>	Marsh barbel		+	
2	Aizoaceae	<i>Cyperus difformis</i>	Tunga			+
3	Amaranthaceae	<i>Choris inflata</i>	Purple chloris	+		

S. No	Family	Scientific Name	Common Name	Grasses	Broad leaved weed	Sedges
4	Amranthaceae	<i>Rungia repens</i>	Creeping rungia	+		
5	Asteraceae	<i>Commelina benghalensis</i>	Tropical spiderwort		+	
6	Asteraceae	<i>Leucas aspera</i>	Common leucas		+	
7	Auphorbiaceae	<i>Cyperus rotundus</i>	Purple nut-sedge			+
8	Commelinaceae	<i>Cyperus tenculmis</i>	-			+
9	Convovulaceae	<i>Phyllanthus niruvi</i>	Stone breaker		+	
10	Convovulaceae	<i>Covolvulus arevensis</i>	Field bind weed		+	
11	Cyperaceae	<i>Ageratum conyzoides</i>	Goat weed			
12	Cyperaceae	<i>Euphorbia pulcherima</i>	Poinsettia		+	
13	Cyperaceae	<i>Panicum javanicum</i>	-	+		
14	Cyperaceae	<i>Acalypha indica</i>	Indian copperleaf			
15	Cyperaceae	<i>Lantana camara</i>	Wild sage		+	
16	Marsileaceae	<i>Marselia quadrifolia</i>	European waterclover		+	
17	Euphorbiaceae	<i>Digera muricata</i>	False amaranth		+	
18	Euphorbiaceae	<i>Aerva lanata</i>	Mountain knotgrass			+
19	Euphorbiaceae	<i>Corchorus aestuans</i>	East Indian jews mallow		+	
20	Euphorbiaceae	<i>Phyllanthus maderaspatensis</i>	Madras leaf flower		+	
21	Lamiaceae	<i>Ammannia baccifera</i>	Blistering ammannia		+	
22	Lythraceae	<i>Phyllanthus amarus</i>	sanskrit		+	
23	Phyllanthaceae	<i>Croton bonplandianum</i>	Three leaved caper		+	
24	Poaceae	<i>Trianthema protulacastrium</i>	Horse purslane		+	
25	Poaceae	<i>Echinochloa colona</i>	Barnyard grass	+		
26	Poaceae	<i>Echinochloa crusgalli</i>	Barnyard grass	+		
27	Poaceae	<i>Fimbristylis aestivalis</i>	Summer fimbry			+
28	Poaceae	<i>Fimbristylis argentea</i>	-			+
29	Poaceae	<i>Cynodon dactylon</i>	Garika (Bermuda grass)		+	
30	Poaceae	<i>Euphorbia hirta</i>	Asthma herb		+	

S. No	Family	Scientific Name	Common Name	Grasses	Broad leaved weed	Sedges
31	Tilaceae	Parthenium hysterophorus	Congress weed		+	
32	Verbenaceae	Apluda mutical	Mauritian grass	+		

### Findings & Conclusion

This study sought to explore the diversity of weeds and arthropods in rice field of Usali Taluk, Tamil nadu region. From the study, it can be clearly confined that among weeds, *Nymphalidae* family weeds can be seen more on rice field, in addition among arthropods, *Poaceae* family of arthropods can be seen more on the selected agro fields. From these results, farmers and agricultural experts can plan their strategy towards integrated pest management with the assistance of managing these arthropods and weeds. However, this study limited with the geographical constraints and more focus on butterflies under arthropods category owing to its importance towards IPM, since other species to be included in future.