



A CHECK LIST OF LEAFHOPPER FAUNA (HEMIPTERA: CICADELLIDAE) IN ANDHRA PRADESH

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ABSTRACT

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A check list of leafhopper fauna associated with different crop-ecosystems in Andhra Pradesh was prepared. A total of 116 species belonging to 44 genera and 21 tribes were identified from Andhra Pradesh. The tribes viz., Deltocephalini, Emposcini and Erythroneurini were found to be the dominant tribes including 47 species among the described list. The genus *Maiestas* was found to be the most predominant genus including 22 species. Among the leafhopper fauna, *Austrogallia bifurcata* Sawaisingh and Gill, *Exitianus indicus* (Distant), *E. nanus* (Distant), *N. virescens* (Distant), *M. vulgaris* Dash and Viraktamath, *M. dorsalis* Motschulsky, *M. subviridis* (Metcalf), *Amrasca devastans* (Distant), *Emopasca (Emposca) kerri* Pruthi, *E. (E.) motti* Pruthi, *E. (E.) spiroso* Dworakowska and Viraktamath, *E. maculifrons* (Motschulsky), *Seriana jaina* (Distant), *Hecalus ghaurii* Ramasubba Rao and Ramakrishnan, *H. porrectus* (Walker), *H. prasinus* (Matsumura), *Balclutha incisa* (Matsumura), *B. saltuella* (Kirschbaum), *Cicadulina (Cicadulina) bipunctata* (Melichar), *Hishimonus phycitis* (Distant), *Doratulina rubrolineata* (Distant) and *D. rotundus* (Pruthi) were predominant and found to be associated with a number of crop-ecosystems. A list of these leafhoppers and associated crop- ecosystems / source was provided.

KEY WORDS: Hemiptera, Cicadellidae, Leafhoppers.

INTRODUCTION

Leafhoppers, an economically important group of Auchenorrhynchan Hemiptera belong to the family Cicadellidae comprising about 2,445 described genera and 22,637 species World wide and 340 genera and 1,350 species in India, respectively (Viraktamath, 2005). Leafhoppers are small wedge shaped insects of various forms, colours, sizes and can be readily distinguished from other Auchenorrhyncha by having one or more rows of small spines extending the length of hind tibiae. They are phytophagous and commonly suck sap from leaves, although many species are known to feed on different parts of the plant. Many of the members of Cicadellidae are very serious crop pests that suck sap directly from vital cells and tissues of plants resulting in damage to leaves and stems thus producing general symptoms like curling of leaves, bronzing, drying and followed by withering and death of plants. The oviposition of leafhoppers causes injury to leaf veins and sheets. A few groups of leafhopper genera act as vectors and transmit phytopathogenic

organisms (viruses, mycoplasmas, spiroplasmas and bacteria) that cause diseases and eventual death of plants. Some of the diseases caused by phytopathogenic organisms vectored by leafhoppers include, little leaf of brinjal, sesamum phyllody, purple top of potato, yellow dwarf of rice, rice tungro (Muniyappa and Veeresh, 1986), rice transitory yellowing, sandal spike, eastern wheat striate virus and maize streak virus, orange leaf of rice, etc., (Wilson and Claridge, 1991).

Since independence efforts were made to improve the yield of crops by introduction of high yielding varieties (HYV) and hybrids and adoption of improved agronomic practices. Many of the HYV's and hybrids are generally susceptible to insect pests. Also, due to changes in agronomic practices some of the minor and / or unknown pests may assume the status of major pests. For example, the rice green leafhoppers and planthoppers which were minor pests prior to the seventies, have now assumed major pest status (Kalode, 1983). The accurate identification of a pest species affecting the crop ecosystem is the first -

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and foremost step for its effective suppression in integrated pest management programme. In this context knowledge on the association between leafhoppers and crop-ecosystems and the occurrence of vectors species is of utmost importance.

MATERIAL AND METHODS

A large number of leafhopper specimens were collected at light, grasses, weeds, shrubs *etc.*, in addition to different crop-ecosystems. About 10-15 to and fro net sweepings were taken each time and leafhoppers collected were aspirated from the net into a glass tube and killed with a cotton swab wetted with a few drops of ethyl acetate. The leafhoppers attracted to light were directly aspirated into a glass tube and were killed with ethyl acetate swab. The killed specimens were transferred to homeopathic vials, labeled, brought to the laboratory and dried in a hot air oven at 45-50°C, for about 5 to 6 hours. The dried specimens were stored in small glass vials and labeled. For mounting and preparing slides of genitalia the procedure suggested by Knight (1965) was followed. In the present paper the terminology advocated by Blocker and Triplehorn (1985) was followed to describe different body parts of a leafhopper.

RESULTS AND DISCUSSION

A total 116 species of leafhoppers and their associations with different crop-ecosystems were presented in table-1. Manzoor (1987) studied 33 typhlocybinae leafhoppers associated with vegetable crop-ecosystems and losses caused in Pakistan. Viraktamath and Viraktamath (1995) reported 123 species leafhoppers and their host plants in Karnataka. Jacob *et al.* (2000 and 2002) studied the leafhopper fauna associated with oil seed and pulse crops and reported 40 species on oil seed crops and 41 species on pulses. Reddy and Rao (2001) reported 17 species of leafhoppers associated with vegetable crops. Kamala *et al* (2002) reported 23 species of leafhoppers associated with rice ecosystems in coastal Andhra Pradesh. Chalam and Rao (2005) reported 37 leafhopper species belonging to 17 genera from different graminaceous crop-ecosystems like rice, sorghum, maize, sugarcane, finger millet, pearl millet and proso millet. Ramasubbarao *et al.* (2006) published a handbook for the identification of leafhopper fauna (Cicadellidae: Hemiptera) of Andhra Pradesh which covers the diagnosis and

keys for identification of 105 leafhoppers associated with different crop ecosystems of Andhra Pradesh along with their colour photographs.

The knowledge on leafhoppers associated with different crop-ecosystems will be a useful tool to design Integrated Pest Management strategies. This information also encourages the economic entomologists to gather further information on the host plants, ecology and biology of other species of leafhoppers, which is needed to better understand this economically important group of insects.

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Table 1 : Leafhopper fauna associated with different crop- ecosystems in Andhra Pradesh

S.No	Name of the Species	Associated crop- ecosystems / Source
TRIBE: AGALLIINI		
1.	<i>Austrogallia bifurcata</i> Sawaisingh and Gill	Greengram, dolichos, pigeonpea, sesamum, groundnut, sunflower, amaranthus, blackgram and rice
2.	<i>Agallia campbelli</i> Distant	Grass
3.	<i>A. robusta</i> Pruthi	Light
TRIBE: ATHYSANINI		
4.	<i>Banus sp.nr. confuscus</i> (Pruthi)	Grass
5.	<i>Exitianus indicus</i> (Distant)	Groundnut, greengram, maize blackgram, soybean, sorghum, berseem, rice, chillies, spinach, amaranthus, ridgegourd, brinjal cucumber, finger millet and proso millet
6.	<i>E. nanus</i> (Distant)	Greengram, blackgram, soybean, maize, redgram, rice, sorghum and groundnut
7.	<i>Mimotettix</i> Sp.	Grass
8.	<i>Nephotettix nigropictus</i> (Stal)	Rice and grass
9.	<i>N. virescens</i> (Distant)	Soybean, groundnut, rice, blackgram, redgram, sorghum berseem and pearl millet
TRIBE: CHIASMUSINI		
10.	<i>Aconurella indica</i> (Pruthi)	Blackgram, groundnut and rice,
11.	<i>A. neosolana</i> Ramasubba Rao and Ramakrishnan	Blackgram, greengram, soybean, groundnut, sunflower and grass.
12.	<i>A. proluxa</i> (Lethierry)	Groundnut, sesamum and grass.
13.	<i>Chiasmus alata</i> Pruthi	Groundnut and grass
14.	<i>C. niger</i> Pruthi	Grass

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S. No	Name of the Species	Associated crop- ecosystems / Source
TRIBE: CICADELLINI		
15.	<i>Cofana spectra</i> Distant	Rice, sugarcane and groundnut
16.	<i>C. unimaculata</i> (Signoret)	Greengram, blackgram, rice and groundnut
17.	<i>C. subvirescens</i> (Stal)	Rice
TRIBE: DELTOCEPHALINI		
18.	<i>Maiestas bapatlensis</i> Jacob and Ramasubba Rao	Groundnut, sunflower and grass
19.	<i>M. vulgaris</i> Dash and Viraktamath	Greengram, sorghum, blackgram, groundnut and berseem
20.	<i>M. acuminatus</i> Dash and Viraktamath	Greengram and grass
21.	<i>M. bispinosus</i> Dash and Viraktamath	Grass
22.	<i>M. breviculus</i> Dash and Viraktamath	Greengram and rice
23.	<i>M. cuculatus</i> Dash and Viraktamath	Grass
24.	<i>M. delongi</i> Chalam and Ramasubba Rao	Light
25.	<i>M. distinctus</i> Motschulsky	Greengram, blackgram, rice and grass
26.	<i>M. dorsalis</i> Motschulsky	Greengram, chickpea, blackgram, horsegram, rice, grass and groundnut
27.	<i>M. fletcheri</i> (Pruthi)	Grass
28.	<i>M. hospes</i> (Kirkady)	Grass
29.	<i>M. intermedius</i> Melichar	Grass
30.	<i>M. krameri</i> Ramasubba Rao and Ramakrishnan	Rice, grass and groundnut
31.	<i>M. menoni</i> (Ramasubba Rao and Ramakrishnan)	Grass
32.	<i>M. parapruthii</i> Chalam and Ramasubba Rao	Light
33.	<i>M. pruthii</i> Metcalf	Rice and grass
34.	<i>M. subviridis</i> (Metcalf)	Greengram, grass, horsegram, blackgram, rice, maize and groundnut
35.	<i>M. systemos</i> Dash and Viraktamath	Grass
36.	<i>M. tareni</i> Dash and Viraktamath	Rice and grass
37.	<i>M. variabilis</i> Dash and Viraktamath	Grass
38.	<i>M. veinatus</i> (Pruthi)	Rice and grass
39.	<i>M. xanthocephalus</i> Dash and Viraktamath	Grass
40.	<i>Soractellus nigrominutus</i> Evans	Grass

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TRIBE: DIAKRANEURINI		
41.	<i>Uzeldikra citrina</i> (Melichar)	Castor
TRIBE: EMPOASCINI		
42.	<i>Amrasca bilobata</i> Mathew and Ramakrishnan	Groundnut, Mesta, Okra and sunflower
43.	<i>Amrasca devastans</i> (Distant)	Greengram, pigeonpea, blackgram, chickpea, soybean, cowpea, castor, groundnut, sunflower, mustard, cotton, brinjal, okra, mesta, radish, tomato, ridgegourd, spinach, clusterbean, frenchbean, gardenbean, cauliflower, chillies and dolichos
44.	<i>Alebroides clavatus</i> Sohi and Dworakowska	Redgram
45.	<i>Emopasca (Empoasca) kerri</i> Pruthi	Greengram, castor, pigeonpea, blackgram, soybean, horsegram, cowpea, groundnut and sunflower
46.	<i>E. (E.) motti</i> Pruthi	Cowpea, mesta, coccinia, brinjal, frenchbean, broadbean, chillies, radish, amaranthus, spinach, ridgegourd, niger, clusterbean, bittergourd, okra, greengram, pigeonpea, blackgram, soybean, groundnut, sunflower, castor and mustard
47.	<i>E. (E.) spirosa</i> Dworakowska and Viraktamath	Greengram, castor, pigeonpea, blackgram, soybean, horsegram, cowpea, groundnut, sunflower, niger and mustard
48.	<i>E. (E.) punjabensis punjabensis</i> Pruthi	Bittergourd, coccinia, cucumber, snakegourd and ridgegourd
49.	<i>E. (Distantasca) terminalis</i> Distant	Dolichos, Sweet potato, French bean, Greengram and Redgram
50.	<i>Empoasca (Empoasca) lillae</i> Dworakowska	Bitter gourd
51.	<i>Ficiana pruthii</i> Ghauri	Light
52.	<i>Jacobiasca boninensis</i> (Matsumura)	Light
53.	<i>Cubnara pattambiensis</i> Mathew and Ramakrishnan	Light

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TRIBE: ERYTHRONEURINI		
54.	<i>Empoascanara defecta</i> Dworakowska	Spinach and Rice
55.	<i>E. indica</i> (Datta)	Greengram, blackgram, groundnut
56.	<i>E. maculifrons</i> (Motschulsky)	Amaranthus, spinach, tomato, coriander, mesta, ridgegourd, greengram and groundnut
S. No	Name of the Species	Associated crop- ecosystems / Source
57.	<i>E. prima</i> (Distant)	Greengram and blackgram
58.	<i>Tautoneura ficaria</i> Dworakowska	Tomato and Redgram
59.	<i>Tautoneura prima</i> Dworakowska	Redgram
60.	<i>Thaia (Nlunga) drutoidea</i> Dworakowska	Light
61.	<i>Thaia (Nlunga) indica</i> Dworakowska	Grass and light
62.	<i>Thaia (Nlunga) lankaensis</i> Dworakowska	Light and grass
63.	<i>Zyginopsis verticalis</i> Ahmed	Maize
64.	<i>Gambiola basa</i> Sohi and Man	Castor
65.	<i>Seriana jaina</i> (Distant)	Greengram, cowpea, pigeonpea, blackgram, horsegram, groundnut and rice
TRIBE: GONIAGNATHINI		
66.	<i>Goniagnathus fumosus</i> Distant	Rice and grass
67.	<i>G. guttulinervis</i> (Kirschbaum)	Grass and groundnut
68.	<i>G. punctifer</i> (Walker)	Groundnut, maize, greengram and blackgram
TRIBE: HECALINI		
69.	<i>Hecalus arcuatus</i> (Motschulsky)	Blackgram and grass
70.	<i>H. ghaurii</i> Ramasubba Rao and Ramakrishnan	Blackgram, redgram and rice
71.	<i>H. paraumballaenis</i> Ramasubba Rao and Ramakrishnan	Blackgram, rice, sorghum, grass, finger millet and prosomillet
72.	<i>H. porrectus</i> (Walker)	Groundnut, brinjal, greengram, blackgram, rice, sorghum, berseem, cucumber and grass
73.	<i>H. prasinus</i> (Matsumura)	Groundnut, sunflower, blackgram, rice and grass
74.	<i>H. pusae</i> Ramasubba Rao and Ramakrishnan	Rice and grass
TRIBE: IASSINI		
75.	<i>Batracomorphus angustatus</i> (Osborn)	Rice, groundnut, redgram and greengram

S. No	Name of the Species	Associated crop- ecosystems / Source
TRIBE: IDIOCERINI		
76.	<i>Amritodus atkinsoni</i> (Lethierry)	Mango and sapota
77.	<i>Idioscopus clypealis</i> (Lethierry)	Mango
78.	<i>I. niveosparsus</i> (Lethierry)	Mango
79.	<i>I. nagapurensis</i> (Pruthi)	Mango
80.	<i>I. scutellatus</i> (Distant)	Mango
TRIBE: MACROSTELINI		
81.	<i>Balclutha incisa</i> (Matsumura)	Greengram, redgram, pigeonpea, blackgram, chickpea, soybean, cowpea, castor, sorghum, rice, pearl millet, groundnut and mustard.
82.	<i>B. lucida</i> (Butler)	Blackgram and grass
83.	<i>B. pararubrostriata</i> Ramasubba Rao and Ramakrishnan	Blackgram, rice and proso millet
84.	<i>B. punctata</i> (Fabricius)	Rice and barley
85.	<i>B. rubrostriata</i> (Melichar)	Rice and grass
86.	<i>B. saltuella</i> (Kirschbaum)	Greengram, redgram, pigeonpea, blackgram, chickpea, soybean, cowpea, sorghum, groundnut, castor, niger, pearl millet, sugarcane and grass.
87.	<i>B. thea</i> (Distant)	Grass
88.	<i>Cicadulina (Cicadulina) bipunctata</i> (Melichar)	Greengram, sorghum, blackgram, broadbean, rice, amaranthus, mesta, spinach, castor, niger, groundnut and proso millet
89.	<i>Yamatotettix sexnotatus</i> (Izzard)	Sugarcane

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S.No	Name of the Species	Associated crop- ecosystems / Source
TRIBE: NIRVANINI		
90.	<i>Nirvana pallida</i> Melichar	Greengram
91.	<i>Nirvana</i> Sp.	Guava
TRIBE: OPISIINI		
92.	<i>Hishimonus</i> Sp.	Sesamum
93.	<i>Hishimonus nielsoni</i> Knight	Greengram and sesamum
94.	<i>H. phycitis</i> (Distant)	Rice, greengram, cotton, okra, greengram, variga, brinjal, ridgegourd, clusterbean, grass and prosomillet
95.	<i>Chlorotettix versicolor</i> Pruthi	Greengram
96.	<i>Orosius orientalis</i> (Matsumura)	Greengram, blackgram, sesamum and rice
TRIBE: PARALIMNINI		
97.	<i>Hengchunia pakistanica</i> Asche and Webb	Grass
TRIBE: SCAPHOIDEINI		
98.	<i>Scaphoideus harlani</i> Kitbamroong and Freytag	Grass
99.	<i>S. sabourensis</i> Ramasubba Rao and Ramakrishnan	Rice, sesamum and grass
TRIBE: SCAPHYTOPIINI		
100.	<i>Grammacephalus pallidus</i> Linnavuori	Grass
101.	<i>Masiripius lugubris</i> (Distant)	Greengram
102.	<i>Varta rubrofasciata</i> Distant	Sorghum
TRIBE: SCELENOCEPHALINI		
103.	<i>Tambocerus viraktamathi</i> Rao	Grass

S. No	Name of the Species	Associated crop- ecosystems / Source
TRIBE: STENOMETOPIINI		
104.	<i>Doratulina apicalis</i> (Pruthi)	Groundnut, sunflower, horse gram and grass
105.	<i>D. indra</i> (Distant)	Light
106.	<i>D. illustrata</i> (Distant)	Grass
107.	<i>D. khwrensis</i> (Pruthi)	Light
108.	<i>D. rotundus</i> (Pruthi)	Blackgram, greengram, rice, berseem, grass, maize and finger millet.
109.	<i>D. rubrolineata</i> (Distant)	Greengram, cowpea, pigeonpea, blackgram, soybean, rice, sugarcane, groundnut and sesamum
110.	<i>D. speciosum</i> (Distant)	Grass
111.	<i>D. tolla</i> (Pruthi)	Blackgram
112.	<i>D. vertica</i> (Pruthi)	Grass
113.	<i>Leofa mushroomi</i> Chalam and Ramasubba Rao	Grass
114.	<i>Leofa mysorensis</i> Distant	Grass
115.	<i>L. naga</i> Viraktamath and Viraktamath	Grass
TRIBE: XESTOCEPHALINI		
116.	<i>Xestocephalus</i> Sp.	Grass