

Host Records of Typhlocybinae (Auchenorrhyncha: Hemiptera: Cicadellidae) of Zoological Museum, University of Karachi, Pakistan

Imran Khatri,^{1*} Maqsood Anwar Rustamani,² Zubair Ahmed,³ Riffat Sultana⁴ and Sahar Zaidi⁵

^{1,2}Department of Entomology, Sindh Agriculture University, Tandojam

³Department of Zoology, Federal Urdu University of Arts, Sciences and Technology, Karachi

⁴Department of Zoology, University of Sindh, Jamshoro

⁵Department of Botany, Federal Urdu University of Arts, Sciences and Technology, Karachi

Abstract.- The host records of leafhoppers of subfamily Typhlocybinae are presented with other data deposited at Zoological Museum University of Karachi Pakistan. In total 59 host plants are presented within 34 families for 113 typhlocybinae leafhoppers.

Key words: Host plant, leafhopper, vernacular names

INTRODUCTION

The host plants and leafhoppers of subfamily Typhlocybinae from Pakistan were extensively studied by Manzoor Ahmed from 1960's to 1985. All his holotypes are deposited in Zoological Museum University of Karachi, the first author visited the museum and studied all his type material. The species described from Bangladesh (former East Pakistan) are not included here, several new combinations and new synonyms were proposed by subsequent authors; Dworakowska (1970, 1977a-c, 1979), Dworakowska and Viraktamath (1975, 1978), Dmitriev (2003 and onwards) and Dietrich and Dmitriev (2006); however, due to the several nomenclatural changes the group needs a substantial revision from the region. Species are listed here with their current status as mentioned by Dmitriev (2003 and onwards), species which were synonymised by Ahmed, 1985 (*Zygina sindhensis* Ahmed 1969b: 164, *Eupteryx kaghanensis* Ahmed 1969c: 318, *Zygina binotata* Ahmed 1969:179, *Zygina thattaensis* Ahmed, 1969c:169, *Eurhadina punctata* Ahmed, 1969:317 and *Zygina setosa* Ahmed 1970c:167) are not included in present list of records. The information given here is from data labels of specimens of Zoological Museum University of Karachi (ZMUK) and from pertinent

literature. In the present list of records a total of 59 host plants are given with 34 families representing 113 species of leafhoppers (genera 46; new species from Pakistan 97 and 16 records).

MATERIALS AND METHODS

Data collection

The data was collected from typhlocybinae specimen labels and pertinent literature at Zoological Museum University of Karachi, Pakistan. For the botanical and vernacular names the databases; Flora of Pakistan (www.efloras.org) and Medicinal Plants (www.parc.gov.pk) were followed.

RESULTS

Table I shows the data on host plant with family name, English name, vernacular name and leafhopper record with species, scientific name, holotype, paratype, locality and date of collection. All are new species of Manzoor Ahmed described from Pakistan except records indicated with asterisk (*). The names of the 8 junior synonyms described from Pakistan are given on separate; indented lines below the corresponding valid species.

DISCUSSION

Ahmed and his co-workers collected number of leafhoppers from all over Pakistan but majority of the new species are described from high altitude; Abbottabad, Murree, Kashmir and their vicinity, thus resulted in major plants of the hilly habitat as

* Corresponding author: imrankhatri.agri@gmail.com
0030-9923/2013/0005-1263 \$ 8.00/0
Copyright 2013 Zoological Society of Pakistan

Table I.- Host records of typhlocybine leafhoppers of Zoological Museum, University of Karachi.

Family	Host record		Leafhopper record				
	Botanical name	English / Vernacular names	Scientific name	Para-type	Locality	Date of collection	
Acanthaceae	<i>Justicia adhatoda</i> L., 1753	vern. Baikar basuti, Vasaka	<i>Gambialoa (Gambialoa) kashmirensis</i> (Ahmed, 1969b:168)	♂	Muzaffarabad	13.vi.1964	
Anacardiaceae	<i>Schinus terebinthifolius</i> Raddi, 1820	Brazilian peppertree	<i>Typhlocyba karachiensis</i> Ahmed & Jabbar, 1971:107	♂	Karachi	17.iii.1970	
Betulaceae	<i>Alnus nitida</i> (Spach) Endl. 1847	Himalayan Alder, vern. Sharol	<i>Samella immaculata</i> (Ahmed, 1971a:201)	♂	Sawat	01.vii.1964	
Brassicaceae	<i>Raphanus sativus</i> Linn., 1753	Radish	<i>Byphlocyba nigropunctata</i> Ahmed, 1971a:199	♂	Sawat	01.vii.1964	
Caesalpinjiaceae	<i>Cassia fistula</i> Linn. 1753	Golden Shower Tree	<i>Agnesiella (Agnesiella) distincta</i> (Ahmed, 1985:88)	♂	Garhi Habibullah	22.ix.1969	
	<i>Delonix regia</i> (Bojer ex Hook.) Raf. 1836	Royal Poinciana or Flamboyant, vern. Gul mohr	<i>Samella hemirigosa</i> (Ahmed, 1970:273)	♂	Garhi Habibullah	21.ix.1969	
Caprifoliaceae	<i>Viburnum grandiflorum</i> Wall. ex DC. 1830	Gul mohr vern. Gutch	<i>Empoasca (Empoasca) khaliqei</i> Ahmed et al., 1981:15	♂	Haripur	19.v.1974	
			<i>Cassianeura cassiae</i> (Ahmed, 1970a:34)	♂	Lyallpur	26.iii.1964	
			<i>Helionidia karachiensis</i> Ahmed & Khokhar, 1971:64	♂	Karachi	28.i.1964	
			<i>Fusiplata murrensis</i> Ahmad, 1969a:62	♂	Murree	09.vi.1964	
			<i>Eurhadina (Singardina) punjabensis</i> Dworakowska, 1969: 76*	-	Murree	1969	
Chenopodiaceae	<i>Spinacia oleracea</i> Linn., 1753	Spinach vern. Palak	<i>Mandola quadrinotata</i> (Ahmed, 1969b:171)	♂	Murree	12.vi.1964	
			<i>Empoasca (Empoasca) mardanensis</i> Ahmed, et al., 1981:13	♂	Mardan	21.v.1974	
			<i>Empoasca (Empoasca) masoodi</i> Naheed & Ahmed, 1980:82	♂	Karachi	11.xi.1975	
Cornaceae	<i>Cornus</i> Linn., 1753	Dogwood	<i>Fusiplata quercicola</i> Ahmad, 1969a:61	♂	Murree	11.vi.1964	
			<i>Mitjaevia maculata</i> (Ahmed, 1970c:175)	♂	Murree	23.ix.1969	
			<i>Bacora variata</i> (Ahmed, 1971a:194)	♂	Abbottabad	08.vi.1963	
			<i>Zygina (Zygina) razii</i> Ahmed, 1969:1969b:163	♂	Murree	27.vi.1963	
Cucurbitaceae	<i>Momordica charantia</i> Linn., 1753	Bittergourd, bitter melon, or bitter squash	<i>Empoasca (Empoasca) sindhensis</i> Naheed & Ahmed, 1980:81	♂	Tando Jam	26.ix.1977	
	<i>Cucurbita pepo</i> Linn., 1753	vern. Karela Pumpkin, yellow-flowered gourd, Pear gourd	<i>Amrasca (Amrasca) biguttula</i> (Ishida 1912:1)*	-	Pakistan	-	
			<i>Empoasca (Empoasca) apodema</i> Ahmed, et al., 1981:12	♂	Haripur	19.v.1974	
			<i>Empoasca (Empoasca) bostanensis</i> Ahmed, et al., 1981:11	♂	Bostan	18.vi.1974	
			<i>Empoasca (Empoasca) punjabensis</i> Singh-Pruthi, 1940:4 *	-	Pakistan	19.v.1974	
			<i>Seriana haripurensis</i> (Samad & Ahmed, 1979b:1)	♂	Haripur	09.v.1974	

Continued

Family	Host record		Leafhopper record				
	Botanical name	English / Vernacular names	Scientific name	Holo-type	Para-type	Locality	Date of collection
Euphorbiaceae	<i>Ricinus communis</i> Linn., 1753	Castor, vern. Arand	<i>Zyginidia (Zyginidia) sawaii</i> Ahmed & Samad, 1980:97	♂	2	Saidu Sharif Bhakhar	12.v.1974
Fagaceae	<i>Quercus dilatata</i> Lindl., 1836	Oak	<i>Jacobiasca lybica</i> (Bergevin & Zanon, 1922) <i>Chlorita signata</i> Haupt, 1927* (syn.) <i>Eupteryx sexnotata</i> Curtis, 1837*	-	-	Murree	1980
	<i>Quercus incana</i> W. Bartram., 1791	Oak	<i>Eurhadina (Singhardina) punjabensis</i> Dworako'wska, 1969:76*	-	-	Murree	1969
	<i>Aesculus indica</i> (Wall.ex Cambess.) Hook. 1859	vern. Barungi, Mom	<i>Eurhadina (Singhardina) vittata</i> Ahmed, 1969c:317	♂	15	Murree	11.vi.1964
Sapindaceae	<i>Quercus incana</i> W. Bartram., 1791	Oak	<i>Mandola quadrinotata</i> (Ahmed, 1969b:171)	♂	4	Murree	12.vi.1964
	<i>Aesculus indica</i> (Wall.ex Cambess.) Hook. 1859	vern. Ban, Rinji Himalayan horse chestnut	<i>Eurhadina (Singhardina) vittata</i> Ahmed, 1969c:317	♂	15	Murree	11.vi.1964
	<i>Juglans regia</i> Linn., 1753	vern. Bankhor (Hazara), Ban-akhor (Rawalpindi)	<i>Ayubiana lantanae</i> Ahmad, 1969a:57	♂	25	Murree	10.vi.1964
Juglandaceae	<i>Juglans regia</i> Linn., 1753	Walnut vern. Akhrot	<i>Erythronera modesta</i> Ahmed, 1970a:41	♂	-	Pakistan	10.vi.1964
			<i>Paratyphlocyba hazarensis</i> Ahmed, 1985:99	♂	9	Abbottabad	08.vi.1963
			<i>Paratyphlocyba swatensis</i> Ahmed, 1985:100	♂	1	Sawat	22.vi.1963
			<i>Eupteryx sexnotata</i> Curtis, 1837*	-	-	Murree	-
			<i>Mandola murrensensis</i> (Ahmed, 1969b:167)	♂	-	Murree	28.vi.1963
			<i>Aguriahana acuta</i> Samad & Ahmed, 1979a:251	♂	2	Chinari	16.v.1969
			<i>Erythronera kashmirensis</i> Ahmad, 1970a:37	♂	2	Muzaffarabad	14.vi.1964
			<i>Baora variata</i> (Ahmed, 1971a:194)	♂	20	Abbottabad	08.vi.1963
			<i>Typhlocyba ismaili</i> Ahmed <i>et al.</i> , 1981:95	♂	11	Abbottabad	17.v.1974
			<i>Typhlocyba rahmani</i> Ahmed <i>et al.</i> , 1981:93	♂	13	Paras	19.iv.1975
			<i>Baora spinosa</i> (Ahmed, 1971a:195)	♂	20	Ghora Gali	15.ix.1969
			<i>Typhlocyba juglansae</i> Ahmed <i>et al.</i> , 1981:90	♂	2	Paras	19.iv.1975
			<i>Zygina (Zygina) javedi</i> Ahmed, 1970c:169	♂	30	Murree	25.ix.1969
Lamiaceae	<i>Mentha</i> Linn., 1753 (<i>Mentha</i> spp.)	Mint vern. Podina	<i>Eupteryx (Eupteryx) multifaciata</i> Singh, 1969 <i>Eupteryx menthae</i> Samad & Ahmed, 1979a:257 (syn)	♂	1	Athmuqam	18.v.1977
			<i>Eupteryx (Eupteryx) parasensis</i> Samad & Ahmed, 1979a:257	♂	4	Paras	19.v.1974
			<i>Eupteryx (Eupteryx) pavlovskii</i> Zachvatkin, 47:109*	-	-	Kaghan	21.vi.1964
	<i>Mentha longifolia</i> (Linn.) 1756	Wild mint	<i>Sertiana peshawarensis</i> (Ahmed, 1969b:161)	♂	6	Peshawar	18.vi.1964
	<i>Mentha X piperita</i> Linn., 1753	Mint vern. Podina	<i>Alebroides nigroscutellatus</i> (Distant, 1918) <i>Empoanara ghulamii</i> Ahmed <i>et al.</i> , 1981:1 (syn) <i>Amrasca (Amrasca) elongata</i> Ahmed, <i>et al.</i> , 1981:19	♂	6	Paras	19.vi.1974
				♂	4	Quetta	13.vi.1974

Continued

Family	Host record		Leafhopper record				
	Botanical name	English / Vernacular names	Scientific name	Holo-type	Para-type	Locality	Date of collection
Malvaceae	<i>Isodon rugosus</i> (Wall. ex Benth.) Codd, 1968	Spairkey vern. khwangere	<i>Kapsa mingorensis</i> (Ahmed, 1970a:40)	♂	7	Sawat	01.vii.1964
	<i>Abelmoschus esculentus</i> (Linn.) Moench, 1794	Okra, ladies finger vern. Bhindi	<i>Amrasca (Amrasca) biguttula</i> (Ishida, 1912:1)*	-	--	Pakistan	-
	<i>Azadirachta indica</i> A. Juss., 1830	Neem, vern. Nim	<i>Karachiota azadirachtae</i> Ahmed, 1969a:59	♂	10	Karachi	04.ix.1963
Mimosaceae	<i>Acacia nilotica</i> (Linn.) Willd. Ex Delile, 1813	Egyptian thorn vern. Babool, Babur	<i>Accacidia garhiensis</i> (Ahmed, 1970c:181)	♂	10	Garhi Habibullah	22.ix.1969
	<i>Albizia lebbek</i> (Linn.) Benth. 1844	vern. siris	<i>Helionidia karachiensis</i> Ahmed & Khokhar, 1971:64 <i>Helionidia chlorotica</i> Ahmed & Khokhar, 1971:70 (syn) <i>Empoasca (Empoasca) albizziae</i> Mahmood, et al., 1969:49	♂	5	Peshawar	06.vii.1964
Moraceae	<i>Ficus carica</i> Linn., 1753	Fig vern. Injeer	<i>Empoasca (Empoasca) syedi</i> Ahmed, et al., 1981	♂	4	Behrin	23.v.1974
	<i>Ficus religiosa</i> Linn., 1753	vern. Peepal, Pipli, Doguri	<i>Farynala confusa</i> Ahmed & Naheed, 1981:83 <i>Farynala saidunensis</i> Ahmed & Naheed, 1981:81 <i>Farynala sternuata</i> Ahmed & Naheed, 1981:79 <i>Jalathia colorata</i> Ahmed, 1970c:177 <i>Velu caricae</i> Ghauri, 1985:163* <i>Sundara mitaniensis</i> (Ahmed, 1971a:197)	♂	3	Balakot	11.v.1974
Oleaceae	<i>Olea ferruginea</i> Royle, 1835	Kao	<i>Tamaricella oleae</i> (Ahmed, 1970c:171)	♂	7	Peshawar	30.x.1969
	<i>Cicer arietinum</i> Linn., 1753	Gram, Chickpea vern. Chana,	<i>Empoasca (Empoasca) cicerae</i> Ahmed, et al., 1981:3	♂	2	Sariab	15.vi.1976
Papilionaceae	<i>Trigonella foenum-graecum</i> Linn., 1753.	Fenugreek vern. Methi	<i>Zyginidia (Zyginidia) behriniensis</i> Ahmed & Samad, 1980:94	♂	1	Behrin (Sawat)	03.v.1974
	<i>Cyamopsis tetragonoloba</i> (Linn.) Taub. 1894	Cluster bean vern. Gwar	<i>Empoasca (Empoasca) cyamopsae</i> Naheed & Ahmed, 1980:80	♂	8	Dumloti	09.vii.1975
Pedaliaceae	<i>Butea monosperma</i> (Lam.) Taub. 1894	Keshu	<i>Empoasca (Empoasca) matti</i> Singh-Pruthi, 1940:9* <i>Sundara longicephala</i> (Ahmed, 1970d:270)	-	-	Karachi	1985
	<i>Sesamum indicum</i> Linn., 1753	Sesamum vern. Til	<i>Empoasca (Empoasca) sesamae</i> Naheed & Ahmed, 1980:79	♂	10	Changa Manga	22.ix.1969
				♂	35	Karachi	28.ix.1977

Continued

Family	Host record		Leafhopper record				
	Botanical name	English / Vernacular names	Scientific name	Holo-type	Para-type	Locality	Date of collection
Pinaceae	<i>Cedrus deodara</i> (Roxb. Ex D. Don) G. Don, 1830	Deodar	<i>Aguriahana spinistyla</i> (Ahmed, 1969c:315)	♂	10	Murree	12.vi.1964
	<i>Pinus</i> Linn., 1753	Pine	<i>Aguriahana pini</i> (Ahmed, 1969c: 313)	♂	22	Murree	12.vi.1964
	<i>Pinus</i> spp.	Lawn Grass	<i>Zyginopsis verticalis</i> (Ahmed, 1970a:31)	♂	1	Peshawar	18.vi.1963
	<i>Cynodon dactylon</i> (Linn.) Pers., 1805	vern. Dub, Khabbal	<i>Alebroides nigroscutellatus</i> (Distant, 1918:93) <i>Alebroides distantii</i> Ahmed, 1969 (syn)	♂	2	Murree	10.vi.1964
Poaceae	<i>Zea mays</i> Linn., 1753	Maize, vern. Makai, Maakki	<i>Dikraneura (Dikraneura) pakistaniensis</i> Ahmad, 1969a:56 <i>Empoascaanara (Empoascaanara) indica</i> (Datta, 1969:391*) <i>Empoascaanara (Empoascaanara) hazarensis</i> (Ahmed, 1970c:179)	♂	2	Murree	10.vi.1964
	<i>Ziziphus jujuba</i> Mill., 1768	Beri vern. Unab, Singli, Baryan	<i>Zyginidia (Zyginidia) quyumi</i> (Ahmed, 1969b:160) <i>Mandola lobata</i> (Ahmed, 1970c:173)	♂	10	Quetta Thai	07.ix.1963 20.ix.1969
	<i>Malus pumila</i> Mill. 1768	Apple vern. Saib, Soof	<i>Qadria pakistanica</i> (Ahmed, 1969b:172) <i>Edwardsiana javedi</i> Ahmed & Naheed, 1981:75	♂	3	Rawalpindi Urak	06.vi.1964 16.vi.1974
	<i>Prunus armeniaca</i> Linn., 1753	Apricot vern. Khoobani	<i>Edwardsiana sharfi</i> Ahmed & Naheed, 1981:76 <i>Empoasca (Empoasca) baluchi</i> Ahmed, et al., 1981:4 <i>Zygina (Zygina) sohii</i> (Ahmed, 1985:251) <i>Erythroneura urakensis</i> Samad & Ahmed, 1979b:3 <i>Hazaraneura kaghanensis</i> Samad & Ahmed, 1979b:251 <i>Typhlocyba ghaniii</i> Ahmed et al., 1981:89 <i>Edwardsiana quettensis</i> (Ahmed, 1971a: 193-195) <i>Baacra variata</i> (Ahmed, 1971:194) <i>Typhocyba neelamensis</i> Ahmed, et al., 1981:92 (syn) <i>Qadria tandjoamensis</i> (Ahmed, 1969b:172) <i>Empoasca (Empoasca) parastriata</i> Ahmed, et al., 1981:5	♂	51	Sariab	15.vi.1974
Rhamnaceae	<i>Prunus persica</i> (Linn.) Batsch, 1801	Peach vern. Aaru	<i>Edwardsiana quettensis</i> (Ahmed, 1971a: 193-195) <i>Baacra variata</i> (Ahmed, 1971:194)	♂	15	Sariab	15.vi.1976 26.v.1977 16.v.1974 16.v.1974
	<i>Rosa chinensis</i> Jacq., 1768	Rose vern. Gulab	<i>Edwardsiana quettensis</i> (Ahmed, 1971a: 193-195) <i>Baacra variata</i> (Ahmed, 1971:194)	♂	1	Urak	22.v.1977
	<i>Rosa chinensis</i> Jacq., 1768	Rose vern. Gulab	<i>Edwardsiana quettensis</i> (Ahmed, 1971a: 193-195) <i>Baacra variata</i> (Ahmed, 1971:194)	♂	1	Garhi Habibullah Athmuqam	17.v.1977
	<i>Rosa chinensis</i> Jacq., 1768	Rose vern. Gulab	<i>Edwardsiana quettensis</i> (Ahmed, 1971a: 193-195) <i>Baacra variata</i> (Ahmed, 1971:194)	♂	15	I-Quetta Athmuqam	05.iv.1964 17.v.1974
Rosaceae	<i>Prunus armeniaca</i> Linn., 1753	Apricot vern. Khoobani	<i>Empoasca (Empoasca) parastriata</i> Ahmed, et al., 1981:5	♂	1	Athmuqam	01.viii.1963 15.v.1977
	<i>Prunus persica</i> (Linn.) Batsch, 1801	Peach vern. Aaru	<i>Empoasca (Empoasca) parastriata</i> Ahmed, et al., 1981:5	♂	3	Tando Jam Sariab	17.iv.1974
	<i>Rosa chinensis</i> Jacq., 1768	Rose vern. Gulab	<i>Empoasca (Empoasca) persicae</i> Ahmed, et al., 1981:7	♂	3	Ziarat	17.iv.1974
	<i>Rosa chinensis</i> Jacq., 1768	Rose vern. Gulab	<i>Eupteryx (Stacta) ahmedi</i> Dworakowska, 1982:176 <i>Domelia nigra</i> Ahmed & Waheed, 1971:117 (sec. homonym) <i>Motischulskyia (Togartititix) serrata</i> (Matsumura, 1931:71) <i>Mahmooodiana acuta</i> Ahmed & Waheed, 1971:116 (syn)	♂	-	Domel	25.ix.1969
<i>Rosa chinensis</i> Jacq., 1768	Rose vern. Gulab	<i>Motischulskyia (Togartititix) serrata</i> (Matsumura, 1931:71) <i>Mahmooodiana acuta</i> Ahmed & Waheed, 1971:116 (syn)	♂	60	Lahore	01.x.1969	

Continued

Family	Host record		Leafhopper record				
	Botanical name	English / Vernacular names	Scientific name	Holo-type	Para-type	Locality	Date of collection
	<i>Prunus cerasus</i> Linn., 1753	Sour cherry	<i>Edwardstana sariabensis</i> Ahmed & Naheed, 1981:76	♂	15	Sariab	15.vi.1974
	<i>Rubus phoenicolasius</i> Max., 1872	Bramble fruit or wineberry	<i>Zyginidia (Zyginidia) younasi</i> (Ahmed & Samad, 1980: 93)	♂	2	Abbottabad	12.v.1974
	<i>Rosa</i> Linn., 1753	Wild Rose	<i>Erythronema atropictila</i> Ahmed, 1970a:35	♂	4	Abbottabad	15.vi.1964
	<i>Rosa</i> spp.		<i>Mitjzevia notata</i> (Ahmed & Khokhar, 1971:70)	♂	12	Murree	8.vi.1964
Rutaceae	<i>Citrus limon</i> (Linn.) Burm.f., 1768	Citrus vern. Jatti khatti, Gulgul, jhambheri.	<i>Empoasca (Empoasca) halaensis</i> Naheed & Ahmed, 1980:77	♂	12	Hala	28.ix.1977
	<i>Zanthoxylum armatum</i> DC., 1824	Winged Prickly Ash vern. Timbar, Timur	<i>Andrabia kashmirensis</i> Ahmed, 1970e:408	♂	6	Abbottabad	26.vi.1964
Salicaceae	<i>Salix tetrasperma</i> Roxb., 1798	Bis or Indian willow vern. Bed-i-lalla, Safaïda	<i>Kusala salicis</i> (Ahmed, 1970a:39)	♂	7	Rawalpindi	04.vi.1964
Solanaceae							
	<i>Solanum tuberosum</i> Linn., 1753	Potato vern. Aloo	<i>Helionidia nigra</i> Ahmed & Khokhar, 1971:69	♂	5	Murree	11.vi.1964
			<i>Zygina (Zygina) mahmoodi</i> Ahmed, 1970c:170	♂	3	Murree	27.ix.1969
			<i>Linnavuoriana (Linnavuoriana) spinosa</i> (Samad & Ahmed, 1979a: 259)	♂	1	Abbottabad	18.v.1974
			<i>Empoasca (Empoasca) capsicae</i> Ahmed, et al., 1981:14	♂	2	Mardan	21.v.1974
			<i>Jacobiasca jamkandensis</i> (Ahmed, et al., 1981:17)	♂	27	Jamkanda	06.xii.1973
			<i>Jacobiasca tuberosa</i> (Ahmed, et al., 1981:16)	♂	3	Jamkanda	02.xi.1975
			<i>Empoasca (Empoasca) punjabensis</i> Singh-Pruthi, 1940:4 *	-	-	Pakistan	19.v.1974
			<i>Eupteryx (Eupteryx) tuberculata</i> Samad & Ahmed, 1979a: 254	♂	1	Abbottabad	17.v.1974
			<i>Amrasca (Amrasca) biguttula</i> (Ishida, 1912:1)*	-	--	Pakistan	-
			<i>Empoasca (Empoasca) punjabensis</i> Singh-Pruthi, 1940:4 *	-	-	Pakistan	19.v.1974
Tamaricaceae	<i>Solanum melongena</i> Linn., 1753	Brinjal, Egg Plant vern. Baingan	<i>Zyginidia (Zyginidia) bindrai</i> Ahmed & Samad, 1980:96	♂	1	Mingora	22.v.1974
	<i>Lycopersicon esculentum</i> Mill, 1768	Tomato, vern. Tamatar	<i>Empoascanara (Empoascanara) prima</i> Distant, 1918:94*	-	-	Thatta	1969
	<i>Tamarix aphylla</i> (Linn.) Karst, 1882	Athel pine, Athel tree, Athel tamarisk, and saltceda vern. Jhao	<i>Quadria rubronotata</i> (Distant, 1918: 92) *	-	-	Lower Sindh	1985
Tiliaceae	<i>Grewia asiatica</i> Linn., 1767	Falsa vern. Pharwa					

Continued

Family	Host record		Leafhopper record				
	Botanical name	English / Vernacular names	Scientific name	Holo-type	Para-type	Locality	Date of collection
Ulmaceae	<i>Ulmus villosa</i> Brandis ex Gamble, 1902	Cherry-bark Elm vern. Mannu	<i>Baaoora garhiensis</i> (Ahmed, 1970d:272)	♂	50	Garhi Habibullah	21.ix.1969
	<i>Ulmus wallichiana</i> Planch. 1848	Kain or Kashmir Elm	<i>Aguriahana kaghanensis</i> (Ahmed, 1970d:274)	♂	30	Garhi Habibullah	21.ix.1969
Umbelliferae	<i>Coriandrum sativum</i> Linn., 1753	Coriander vern. Dhania	<i>Empoasca (Empoasca) planata</i> Ahmed, et al., 1981:8	♂	64	Murree	29.vi.1963
	<i>Debregeasia salicifolia</i> (D. Don) Rendle, 1916	Chinjhal vern: Puruni, Siaru,	<i>Tautoneura alba</i> (Ahmed, 1971c:278)	♂	10	Haripur	17.v.1974
Vitaceae	<i>Vitis vinifera</i> Linn., 1753	Siharu. Grape vern. Angoor	<i>Arboridia (Arborifera) samadi</i> (Samad & Ahmed, 1979b:2a)	♂	40	Havelian	26.vi.1964
			<i>Jacobiasca viniferae</i> (Ahmed, et al., 1981:18)	♂	2	Karachi	19.ix.1975
			<i>Empoasca (Empoasca) albizziae</i> Mahmood, et al., 1969: 49	♂	15	Mirpur Khas Karachi	15.vii.1975 08.vi.1976
			<i>Empoasca karachiensis</i> Ahmed, et al., 1981a:10 (syn.)	♂	4	Hazara	10.ix.1975
			<i>Erythroneura chandhrii</i> Samad & Ahmed, 1979b:2	♂	7	Haripur	26.v.1977
			<i>Zygina (Zygina) sohii</i> (Ahmed, 1985:251)	♂	10	Kaghan	23.vi.1964
			<i>Arboridia (Arborifera) vinealis</i> (Ahmed, 1970a:32)	♂			

host records including; apple, apricot, fig, walnut, himaliyan alder, himaliyan horse chesnut, oak, other vegetables and economical plants and trees from all over Pakistan. *Amrasca biguttula* is the most abundant and widely distributed species and is recorded on important crops and vegetables; Pumpkin, Okra, Brinjal, Tomato and the second most commonly recorded leafhopper is *Empoasca punjabensis*. Genus *Empoasca* comprises 19 species recorded on various crops. Genera recorded with single species and single host include; *Accacidia*, *Agnesiella*, *Ayubiana*, *Cassianeura*, *Byphlocyta*, *Gambialoa*, *Jalalia*, *Kapsa*, *Motschulskyia*, *Velu*, *Zyginopsi*.

REFERENCES

- AHMED, M., 1969a. Studies of tribe Dikraneurini (Typhlocybinae, Homoptera) from West Pakistan. *Pakistan J. Zool.*, **1**: 55-63.
- AHMED, M., 1969b. Studies of the genus *Zygina* Fieber (Homoptera, Erythroneurini, Cicadellidae) in West Pakistan. *Pakistan J. Zool.*, **1**:157-175.
- AHMED, M., 1969c. Studies of the genera of *Eupteryx* complex (Typhlocybini: Homoptera) in West Pakistan. *Pakistan J. Zool.*, **19**: 311-320.
- AHMED, M., 1969d. Some recent studies of *Empoasca* complex in Pakistan and their bearing on tribal classification of sub-family Typhlocybinae (Homoptera: Cicadellidae). *Agric. Pak.*, **4**: 451-455.
- AHMED, M., 1970a. Studies of the genus *Erythroneura* Fitch (Erythroneurini: Cicadellidae) in West Pakistan. *Pakistan J. Zool.*, **2**: 29-42.
- AHMED, M., 1970b. Host and food plants of Typhlocybinae leafhoppers in Pakistan. *Pak. J. Forest.*, **20**: 217-223.
- AHMED, M., 1970c. Further studies on the leafhoppers of tribe Erythroneurini (Cicadellidae: Typhlocybinae) from West Pakistan. *Pakistan J. Zool.*, **2**: 167-184.
- AHMED, M., 1970d. Some species of *Typhlocyba* Germar (Typhlocybinae: Cicadellidae) occurring in West Pakistan. *Pakistan J. Sci.*, **22**: 269-276.
- AHMED, M., 1970e. *Andrabia* new genus and *A. kashmirensis* new species (Typhlocybinae, Cicadellidae) on the plant tember, *Zanthoxylum alatum* in northern areas of West Pakistan. *Pakistan J. Sci.*, **13**: 407-409.
- AHMED, M., 1971a. Study of a new genus and some species of *Typhlocyba* Germar (Typhlocybini: Cicadellidae) in West. *Pakistan J. Sci. Univ. Kar.*, **1**: 190-202.
- AHMED, M., 1971b. A preliminary account of the distribution of Typhlocybinae fauna in forests of West Pakistan. *Pakistan J. Forest.*, **20**: 53-60.

- AHMED, M., 1971c. *Havelia alba*, new genus, new species (Typhlocybinae: Homoptera) on a forest plant *Debregeasia hypoleuca* in parts of West Pakistan. *Pakistan J. Forest.*, **21**: 277-280.
- AHMED, M., 1971d. Studies on the genera and species of tribe Erythroneurini (Cicadellidae, Typhlocybinae) in East Pakistan. *Pakistan J. Zool.*, **3**: 175-192.
- AHMED, M., 1972a. Some preliminary observations on the distribution of Typhlocybinae leafhoppers on woody and fruit trees in West Pakistan. *J. Sci. Univ. Kar.*, **1**: 175-192.
- AHMED, M., 1972b. Some more genera and species of Typhlocybinae (Cicadellidae: Homoptera) from East Pakistan. *Pak. J. scient. indust. Res.*, **15**: 67-71.
- AHMED, M., 1983. *Biotaxonomy of Typhlocybinae leafhoppers of Pakistan*. Internation Workshop Auchenorrhyncha. London, pp. 179-193.
- AHMED, M., 1986. Some investigations of leafhoppers of grasslands and allied crops in Pakistan. *Proc. Pakistan Congr. Zool.*, **6**: 51-62.
- AHMED, M. AND AZIZ, A., 1988. Two new species of grassland leafhoppers (Cicadellidae: Homoptera) in lower Sind, Pakistan. *Sarhad J. Agric.*, **4**: 805-811.
- AHMED, M. AND JABBAR, A., 1971. *Typhlocyba karachiensis*, new species (Typhlocybinae: Homoptera) a pest of *Schinus tubernanthifolius* in Karachi, West Pakistan. *Agric. Pak.*, **22**: 107-112.
- AHMED, M. AND WAHEED, A., 1971. Two new genera of Typhlocybinae (Homoptera: Cicadellidae) feeding on rose (*Rosa indica*), in west Pakistan. *Pak. J. scient. indust. Res.*, **14**: 116-117.
- AHMED, M. AND SAMAD, K., 1980. Erythroneurine leafhoppers of fruit and vegetable plants in Pakistan. *Pakistan J. Zool.*, **12**: 93-98.
- AHMED, M. AND KHOKHAR, K.F., 1971. Genus *Helionidia* Zachvatkin (Erythroneurini: Cicadellidae) with four new species from West Pakistan. *Sindh Univ. Res. J. (Sci. ser.)*, **5**: 63-72.
- AHMED, M. AND NAHEED, R., 1981. On some species of the genera *Edwardsiana* and *Farynala* (Typhlocybinae: Cicadellidae) from Pakistan. *Reich. Staat. Mus. Tier. Dres.*, **19**: 75-83.
- AHMED, M. AND RAO, S., 1986. Some commonly found leaf and planthoppers on vegetable plants in the suburbs of Peshawar N.W.F.P., Pakistan. *Proc. Pakistan Congr. Zool.*, **6**: 73-80.
- AHMED, M., SAMAD, K. AND NAHEED, R., 1981. *Empoascan* leafhoppers infesting fruit and vegetable plants in Pakistan. *Ent. Scand.*, **12**: 1-21.
- AHMED, M., NAHEED, R. AND SAMAD, K., 1981. On some species of genus *Typhlocyba* Germar (Typhlocybinae: Cicadellidae) from Pakistan. *Reich. Staat. Mus. Tier. Dres.*, **19**: 89-95.
- AHMED, S. S., NAHEED, R. AND AHMED, M., 1980. Three new species of Idiocerine leafhoppers. *Proc. Pakistan Congr. Zool.*, **1B**: 221-225.
- DIETRICH, C.H. AND DMITRIEV, D.A., 2006. Review of the new world genera of the leafhopper tribe Erythroneurini (Hemiptera: Cicadellidae: Typhlocybinae). *Illinois Nat. Hist. Surv. Bull.*, **37**: 119-190.
- DISTANT, W.L., 1918. Rhynchota-Homoptera: Appendix. Heteroptera: Addenda. *The Fauna of British India including Ceylon and Burma*. vol. 7: viii+210 pp.
- DMITRIEV, D.A., 2003 onwards. *Dmitry A. Dmitriev – Home page*. Available from [Http://ctap.inhs.uiuc.edu/dmitriev/](http://ctap.inhs.uiuc.edu/dmitriev/) (accessed February 19, 2010).
- DWORAKOWSKA, I., 1970. On some genera of Typhlocybini and Empoascini (Auchenorrhyncha, Cicadellidae, Typhlocybinae). *Bull. Acad. Polon. Sci. Sér. sci. biol.*, **Cl. II**, **18**: 707-716.
- DWORAKOWSKA, I., 1977a. On some north Indian Typhlocybinae (Homoptera, Auchenorrhyncha, Cicadellidae). *Reich. Staat. Mus. Tier. Dres.*, **16**: 284-306.
- DWORAKOWSKA, I., 1977b. On some Typhlocybinae from Vietnam (Homoptera, Cicadellidae). *Folia Ent. Hung.*, **30**: 9-47.
- DWORAKOWSKA, I., 1977c. On some Erythroneurini from Vietnam (Typhlocybinae, Cicadellidae). *Annot. Zool. Bot.*, **131**: 1-50.
- DWORAKOWSKA, I., 1979. On some Typhlocybinae from India and adjoining areas (Homoptera, Auchenorrhyncha, Cicadellidae). *Reich. Staat. Mus. Tier. Dres.*, **17**: 143-162.
- DWORAKOWSKA, I. AND VIRAKTAMATH, C.A., 1975. On some Typhlocybinae from India (Auchenorrhyncha, Cicadellidae). *Bull. Acad. Polon. Sci. Sér. Sci. Biol.*, **Cl. II**, **23**: 521-530.
- DWORAKOWSKA, I. AND VIRAKTAMATH, C.A., 1978. On some Indian Typhlocybinae (Auchenorrhyncha, Cicadellidae). *Bull. Acad. Polon. Sci. Sér. Sci. Biol.*, **Cl. II**, **24**: 539-548.
- EFLORAS, 2012. *Flora of Pakistan*. Published on the Internet <http://www.efloras.org> [accessed 20 November 2012]. Missouri Botanical Garden, St. Louis, MO & Harvard University Herbaria, Cambridge, MA.
- GHAURI, M.S.K., 1962. A new *Typhlocybid* genus and species (Cicadellidae: Homoptera) feeding on rice in Thailand. *Ann. Mag. Nat. Hist.*, **13**: 253-656.
- HAUPT, H., 1927. Homoptera, *Palestine I. Pal. Agri. Exp. St. Bull.*, **8**: 5-43.
- MAHMOOD, S.H., 1967. A study of Typhlocybinae leafhopper genera of the Oriental region. (Thailand, Philippines and adjoining area). *Pac. Ins. Mon.*, **12**: 1-52.
- MAHMOOD, S.H., AHMED, M. AND ASLAM, M., 1969. *Empoasca albizziae* new species (Typhlocybinae: Homoptera), a pest of *Albizia lebeck* in Pakistan.

- Pakistan J. Zool.*, **1**: 49-54.
- MAHMOOD, S.H., SULTANA, S. AND WAHEED, A., 1972. Two new species of *Stirellus* Osborn and Ball (Homoptera: Cicadellidae, Deltocephalinae) from West Pakistan. *Pakistan J. Zool.*, **4**: 79-84.
- NAHEED, R. AND AHMED, M., 1980. Some new species of leafhopper genus *Empoasca* (Typhlocybinae: Cicadellidae) studied on fruit and vegetable plants in Sindh, Pakistan. *Pakistan J. Zool.*, **12**: 77-84.
- PARC, 2012. *Medicinal Plants of Pakistan*. Published on the Internet <http://www.parc.gov.pk/data/medicinal/> [accessed 15 October 2012]. Pakistan Agriculture Research Council Islamabad Pakistan.
- PRUTHI, H.S., 1940. Descriptions of some new species of *Empoasca* Walsh (Eupterygidae, Jassoidea) from North India. *Ind. J. Ent.*, **10**: 1-10.
- SAMAD, K. AND AHMED, M., 1979a. Some genera and species of Dikraneurine and Typhlocybinae leafhoppers from fruit and vegetable plants in Pakistan. *Reich. Staat. Mus. Tier. Dres.*, **17**: 249-260.
- SAMAD, K. AND AHMED, M., 1979b. Erythroneurine leafhoppers of fruit and vegetable plants in Pakistan Part II. Genus *Zygina* Fieber, *Erythroneura* Fitch and *Jalalia* Ahmed. *Islamabad J. Sci.*, **6**: 1-4.
- ZACHVATKIN AND ALEX A., 1947. Homoptera-Cicadina from north-western Persia. I. *Revue d' Entomologie de l'URSS. Publ. Soc. Ent. URSS*, **28**:106-115.

(Received 12 December 2012, revised 26 May 2013)

