

INCIDENCE OF TYPHLOCYBINE LEAFHOPPERS ON VEGETABLE AND FRUIT PLANTS IN BALUCHISTAN (PAKISTAN) 1979

Manzoor Ahmed

University of Karachi, Karachi 32, Pakistan

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A general survey of leafhoppers of fruit and vegetable plants of Pakistan, partly carried out in Baluchistan during 1978, indicated that nearly 25 typhlocybinae species infested some of our important plants. A more organised survey was carried out during 1979 in Baluchistan in seven localities including Quetta, Sariab, Urak, Kuchlaq, Mastung, Pishin and Loralai. As a result 756 samples of leafhoppers belonging to seven important species on seven fruit plants and eleven vegetable plants were studied. *Empoasca punjabensis*, *Edwardsiana quettensis*, and *Empoasca decedens* turned out to be more important on mulberry, muskmelon, apple and cherry. The host plants were observed much heavily infested by leafhoppers in some areas than it appears from means. Similarly *Amrasca devastans* and *Empoasca punjabensis* infested okra, luffa, moong and other vegetable plants more seriously.

INTRODUCTION

Ahmed *et al.* [1,2] reported 25 species of typhlocybinae leafhoppers on vegetable and fruit plants in Baluchistan (Pakistan). It appeared from these preliminary surveys that *Empoasca punjabensis*, *Edwardsiana quettensis*, *Empoasca persicae*, *Amrasca devastans*, and *Erythroneura rhamnocola* were widely distributed in the area. The most heavily infested were apple, peach and apricot amongst fruit plants and turnip, potato, carrot, spinach, sugar beet, chillies, radish and tomato amongst vegetable plants. In view of the possible economic importance of these preliminary results, a more intensive survey of leafhoppers pests of vegetable and fruit plants in Baluchistan was carried out in localities, which had larger concentration of some of these host and food plants.

Due to the hilly terrain of most of the areas under survey, the sampling of leafhoppers was discontinuous, and their number was affected by the availability of host plants. Each sample consisted of insects collected in 25 sweeps of a sweep net. Leafhoppers thus trapped in cloth bags were separated with the help of aspirators, killed with ethyle acetate, identified and counted. The results have been presented in the Table 1.

RESULTS AND DISCUSSION

Of the 756 samples collected and studied, 440 were on seven fruit plants, and 316 on eleven vegetable plants. Plants like cauliflower, gram, long cucumber, onion, and

cucumber were observed to have negligible infestation. The data presented in Table 1 is based on averages of leafhoppers collected from seven representative localities of Baluchistan including Quetta, Sariab, Mastung, Kuchlaq, Pishin, Urak and Loralai from May, but usually from September to November 1979. Like most other insects, the activity of the leafhoppers is also affected by climatic factors, but their number trapped in sweep net samples is more drastically altered with slight change in wind speed, rainfall, and temperature. Apart from a few species collected in negligible numbers, the important leafhoppers species encountered both on fruit as well as vegetable plants were *Empoasca decedens*, *Edwardsiana quettensis*, *Empoasca punjabensis*, *Amrasca devastans*, *Zyginidia* sp., *Erythroneura rhamnocola* and *Empoasca bostanensis*.

Leafhoppers on Fruit Plants. Of the seven species of fruit plants, leafhopper samples on apricot were collected from seven localities, on almond, apple and mulberry from six localities each, on grape vine from four localities, on cherry from two localities, and on muskmelon from one locality only. The number of samples depended upon the abundance of host plant in various localities. The leafhoppers were all collected between temperatures 28 and 40°C, during the months of September to November, 1979. In 440 samples and a total of 1871 leafhoppers collected, *Empoasca punjabensis* was the dominant species forming 44.84 % of the total catch, and infesting six out of seven fruit plant species. The next in abundance were *Edwardsiana quettensis* and *Empoasca decedens* which formed 27.63 and 17.47 % of the total catch respectively. The

Table 1. Incidence and abundance of typhlocybinae leafhoppers studied on fruit and vegetable plants in Baluchistan 1979

Fruit plants	Total Samples	Species & Nos. collected							Total samples	Mean/sample	Months of abundance
		Ed	Eq	Ep	Ad	Znsp	Er	Eba			
Almond	96	150	41	62	18	2	7	—	280	2.91	Sept-Oct.
Apple	86	113	317	74	8	—	—	8	520	6.04	Sept-Nov.
Apricot	112	32	43	328	39	30	3	—	475	4.24	Sept-Nov.
Cherry	28	22	105	18	1	—	2	—	148	5.28	Nov.
Grape-vine	72	10	8	—	21	16	1	30	86	1.19	Sept-Oct.
Mulberry	44	—	3	344	—	—	—	—	347	7.88	Oct.
Muskmelon	2	—	—	13	2	—	—	—	15	7.50	—
Total	440	327	517	839	89	48	13	38	1871	4.25	—
<i>Vegetable plants</i>											
Bottlegourd	30	—	—	182	20	1	—	—	203	6.76	Sept-Oct.
Bittlegourd	22	—	1	309	—	—	—	—	310	14.09	Oct.
Carrot	18	—	—	265	1	—	—	—	266	14.77	Sept.
Chillies	76	—	—	619	193	28	—	—	840	11.05	Sept-Oct.
Coriander	18	—	—	60	3	—	—	—	63	3.50	Oct.
Fenugreck	10	—	—	76	—	—	—	—	76	7.60	Oct.
Cowpea	12	—	—	137	23	—	—	—	160	13.33	Oct.
Luffa	48	—	—	1096	24	82	—	—	1202	25.04	Oct.
Mint	20	—	—	358	32	3	—	—	393	19.65	Sept-Oct.
Moong	6	—	—	207	317	59	—	—	583	97.16	Sept.
Okra	56	—	2	202	3124	1	—	—	3329	59.44	Sept.
Total	316	—	3	3511	3737	174	—	—	7425	23.49	—
G. Total	756	327	520	4350	3826	222	13	38	9296	—	—

Abbreviations used: Ad = *Amrasca devastans.*, Eba = *Empoasca bostanensis.*, Ed = *Empoasca decedens.*, Ep = *Empoasca punjabensis.*, Eq = *Edwardsiana quettensis.*, Er = *Erythroneura rhamnocola.*, Znsp = *Zyginidia* sp.

highest mean numbers of leafhoppers per sample being 7.88, 7.50, 6.04, 5.28, and 4.24 were collected on mulberry, muskmelon, apple, cherry and apricot, respectively. Mulberry was infested by two species (Eq, Ep), muskmelon by two species (Ep, Ad), apple by five species (Eq, Ed, Ep, Ad and Eba), cherry by five species (Eq, Ed, Ep, Ad and Er), and apricot by six species (Ep, Eq, Ed, Ad, Znsp and Er). Although the overall means appear to be quite low and apparently uneconomical, but under more favourable conditions, the mean leafhoppers were considerably higher in number e.g. 14.5 on almond (at Kuchlaq during September), 17.5 on apple (at Quetta and Kuchlaq during October), 23.0 on apricot (at Kuchlaq during September), 17.0

on cherry (at Quetta during November) 27.0 on grape vine (at Sariab during October) and 24.0 on mulberry (at Mastung during October).

Leafhoppers on Vegetable Plants. Of the eleven species of vegetable plants, leafhoppers samples were collected on chillies from six localities, on okra from five localities, on bottlegourd, coriander and luffa from four localities each, on bittergourd from three localities, on carrot, fenugreck and mint from two localities each and on cowpea and moong from one locality each. Most of the leafhoppers were collected at temperatures 26 – 40^o, during the months of September to November, 1979. In 756 samples, and 7425 leafhoppers collected on the eleven plant species,

almost all the leafhoppers belonged to either of the three species, i.e. *Amrasca devastans*, *Empoasca punjabensis* and *Zyginidia* sp. These formed 50.32 % 47.28 % and 2.34 % respectively of the total catch. The high mean catches of leafhoppers per sample being 97.16, 59.44, 25.04, 19.65, were made on moong, okra, luffa and mint respectively. Equally high catches witnessed in case of potato and brinjal were made by Ahmed *et al* [3] in 1978, from the same area. Although the overall means appear quite moderate in significance on many vegetable plants, but in more favourable local conditions, the mean numbers of leafhoppers were considerably higher, e.g. 20.5, 22.0 and 31.0 on bittergourd (at Sariab, Kuchlaq and Pishin respectively during July – October), 19.0 on bottlegourd (at Sariab during September), 32.0 on carrot (at Mastung during September), 36.5 and 59.5 on chillies (at Pishin and Sariab respectively during October-September), 12.5 on coriander (at Mastung during October), 21.5 on fenugreek (at Mastung during October), 51.0, 55.0 and 59.5 on luffa (at Sariab, Quetta and Kuchlaq respectively during October), 34.0 on mint (at Quetta during October), 361.5 and 408 on okra (at Sariab and Quetta respectively during September).

The extent of damage by these leafhoppers to growth, development and yield of host plants has been very little investigated in Pakistan. Ghauri [4] estimated a loss of 36.84 % in yield of cotton in Pakistan, when the mean infestation of cotton leafhoppers (*Amrasca devastans*) was 1 – 4 leafhoppers per leaf. Yunus [5] also stated a similar disastrous loss to cotton by *A. devastans*. Jackson *et al* [6] studied a loss of 43.28 and 45.15 % to cotton seed and lint respectively, when the population of cotton leafhopper increased from 1.43 to 8.13 leafhoppers per leaf. Ahmed and Ahmed [1] assessed the loss of chlorophyll upto 71.26 % (± 2.76), 52.31 % (± 2.48) and 32.5 % (± 1.0) in case of bauhinia, grewia and mango leaves respectively, when their leafhopper population was 36.75, 33.42 and 60

leafhoppers per leaf respectively. Green [7] was of the opinion that population of one leafhopper per sweep of a net could lead to economic damage in case of beet leafhopper. The yield of potato increased by 84.61 and 158.91 % respectively at Faisalabad and Karachi (Pakistan) by controlling leafhoppers (mostly *A. devastans*) whose mean per sweep population was estimated to be approximately 5 – 6 leafhoppers at the time of peak infestation.

Considering the relationship of population of typhlocybines to loss of plants, it can be concluded that most of the important fruit and vegetable plants in Baluchistan are seriously being damaged by leafhoppers, and all host plants showing population of leafhoppers more than one leafhopper per sweep of sweep net need our urgent attention.

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