

# SURVEYS OF LEAFHOPPERS ASSOCIATED WITH UP-COUNTRY TEA

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## Summary

*Vulturnus ornatus* Dist. was found to be the principal leafhopper occurring on three up-country tea estates. Sticky board traps and a suction trap were used to collect the insects. An unusually large percentage of male *V. ornatus* were recovered.

## Introduction

Interest in the leafhoppers associated with up-country tea devolves from the concern with pholem necrosis virus and its possible spread by leafhoppers.

Previous work has been summarized by Redman King (1941), wherein the life cycles of 2 leafhoppers (*Vulturnus ornatus* and *Eutettix apricus* Mel.) and one cercopid (*Neodartus acocephaloides* Mel.) are discussed. However, no mention is made of the relative abundance of these insects under field conditions, nor of the sex ratios found. A total of 11 species of leafhoppers and cercopids were noted as being collected from tea.

## Materials and methods

Trapping was undertaken with sticky board traps and with a suction trap.

The sticky boards were identical with those used by Hutchinson (1955), being 5 × 9 × 3/8", painted chrome yellow and smeared with a proprietary sticker "Pestix," Sherwin Williams Co. and "Ostico," Plant Protection Ltd.). Traps were suspended from angle-iron standards at two levels. The lower trap was fully below the plucking table, and the upper trap was suspended 12 inches above the plucking table. Ten traps were placed at each of 4 locations in fields of mature seedling tea, i.e. Oliphant Estate, Nuwara Eliya, Court Lodge Estate, Kandapola (2 locations) and St Coombs. The locations at Oliphant and Court Lodge were above 6,000 ft elevation. The location at St Coombs No. 3 field was approximately 4,700 ft. The traps were changed fortnightly and the leafhoppers were removed with a dissecting needle into xylene, after which they were transferred to acetone and 50 per cent ethyl alcohol or methylated spirits. Trapping extended over a 13 month period from 18-11-59 to 13-12-60.

The suction trap used was similar to that described by Johnson and Taylor (1955a); equipped with an 18 inch propeller type fan and sampling approximately 2510 cu.ft. air per minute. It was operated at Court Lodge Estate on power taken from the Superintendent's bungalow, and was located within an area of mature tea adjacent to a vegetable garden. The trap was placed in a deep drain, so that the upper opening was just below the level of the surrounding tea. Trapping extended over a 3 month period from 8-8-62 to 8-11-62, and the catch was collected daily at 7 a.m.

## Results

As shown in Table 1, *Vulturnus ornatus* comprised over 99 per cent of the leafhoppers trapped on the sticky boards, and over 74 per cent of the leafhoppers trapped in the suction trap. The sticky board traps also collected considerable numbers of flies and Hymenoptera, as did the suction trap. In addition the suction trap collected large numbers of moths and beetles. Other Homoptera were rare, occasional fulgorids being recovered. No aphids were noted.

TABLE 1.—*Comparison of the numbers of Vulturnus ornatus and other leafhoppers trapped during the surveys*

Trap used	<i>Vulturnus ornatus</i>		Other leafhoppers	
	Number	Percent	Number	Percent
Sticky board	12,016	99.1	112	0.9
Suction	255	74.1	89	25.9

Considerably larger numbers of *Vulturnus* were collected at Oliphant and Court Lodge Estates than at St Coombs, as noted in Table 2. At all locations, however, the number of males recovered was much greater than the number of females (Tables 2 and 3).

TABLE 2.—*Vulturnus ornatus collected at four locations with sticky board traps*

SEX	LOCATION			
	Oliphant	Court Lodge No. 1	Court Lodge No. 2	St Coombs
Male	2,882	3,081	3,848	903
Female	584	255	398	65
Total	3,466	3,336	4,246	968
Percent males	83.2	92.5	90.7	93.3

TABLE 3.—*Vulturnus ornatus collected at one location with a suction trap*

Sex	Number	Percent
Male	201	78.8
Female	54	21.2

The determination of *V. ornatus* was confirmed by Oman (1960). Determinations of the other leafhoppers have yet to be made. However, *Eutettix apricus* appears to have been collected in small numbers.

Populations of *V. ornatus* at Court Lodge and St Coombs were high in January and February, but low towards the end of the year, whereas the population peak at Oliphant was in November.

Females of *V. ornatus* swept from tea at Court Lodge Estate deposited viable eggs in tea planted in large square pots covered with a rectangular cage of glass and plastic screen supported on a light wooden frame. The eggs were deposited within the mesophyll tissue of the leaves, and many hatched to produce nymphs. However an attempt to establish a colony of the insects was not successful.

## Discussion

The predominance of *Vulturnus ornatus* in the collections is not necessarily an indication that this insect is a vector of phloem necrosis virus. However, this insect should be the easiest to collect for the purposes of transmission tests.

If *V. ornatus* ultimately proves to be a vector, a further survey would be of interest, to determine if this leafhopper is less common at lower elevations—a possibility indicated by the relatively low numbers trapped at St Coombs.

The lower percentage of *V. ornatus* collected by the suction trap may have been due to its proximity to the gardens surrounding the bungalow at Court Lodge. Or since the suction trap is non-attractive, it may have collected more representative samples of the insects actually present.

Suction traps sample an almost constant volume of air per unit time, are to some extent independent of wind speed and are probably non-selective, at least with weak-flying or drifting insects (Johnson 1950). From several comparative studies it has been concluded that density estimates with suction traps are likely to be more accurate than when using sticky or tow-net traps to collect weak-flying insects (Johnson 1950). Heathcote (1957) obtained suction trap catches of aphids with a smaller variance than he obtained with water traps, or with either cylindrical or flat sticky traps. Also Lewis (1959) got more consistent trap catches with a suction trap than with sticky or water traps, when all were sited at crop level. Thus by the use of the suction trap a more accurate estimate of the aerial numbers of the leafhoppers is to be expected.

The predominance of male *Vulturnus* might be explained by a sedentary habit of the female. An indication of this possibility is the fact that before a clean pruning was carried out in the area being trapped at Oliphant Estate, the number of males and females trapped was 1595 and 562, respectively. After pruning, when the level of the bushes had been lowered approximately 18 inches, the number of males and females was 1287 and 22, respectively. A possible conclusion is that the females were not attracted over the increased distance.

The inability to rear *V. ornatus* in cages confirmed the report by Redman King (1941) that females brought from the field readily deposited eggs in tea, but females reared in the laboratory did not do so. *V. ornatus* may thus be a leafhopper that does not breed in captivity, so that transmission tests with adults would have to be carried out with field-collected material. Since sweeping tea bushes is difficult, smaller suction traps might be used for the purpose of recovering the leafhoppers in a living condition.

## References

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