Research Note

Unusual Colouration of Nymphs of the Katydid, *Caedicia simplex* (Orthoptera: Tettigonioidea)

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Abstract

THREE brilliant red coloured nymphs of *Caedicia simplex* (Walk.) were found feeding on the purple or dark leaved variety of the common native shrub, ake-ake or *Dodonaea viscosa* Jacquin. The usual colour of such nymphs is vivid green. The red colour of the specimens is not identical with the red pigment in the plant on which they were feeding.

THE usual colour of nymphs of the katydid *Caedicia simplex* (Walk.) is bright green (Lysaght, 1931) and of the adult, a slightly duller green. Amongst a collection of six ante-penultimate nymphs and three adult females, taken at Kelburn, Wellington, during April and May, 1958, were three brilliant red nymphs. All nine specimens were found on a cultivated shrub, *Dodonaea viscosa* Jacquin, the purple or dark-leaved variety of the ake-ake, approximately 8 feet high and 4 feet across, growing in a garden near the University. The leaves of this tree were unusually dark, especially on the surfaces exposed to strongest light.

The colour of three of the nymphs was a brilliant magenta, or according to the colour notation of Ridgeway (1912), closest to amaranth purple, 69 RV-Ri. Green pigment seemed to be completely absent from the specimens. The dorsum and sides of the body, the legs, and the antennae, were amaranth purple, while the venter was pale greyish white, almost colourless. Medial black markings were present on the pronotum and third to sixth abdominal tergites. The pigment is situated in the integument or hypodermis rather than in the body tissues, as the venter, neck membranes and frons would also be coloured if this were not so.

Two nymphs intermediate in colour between the green and red forms also occurred. One was tinged with green over which the red pigment was spread on the dorsum and sides of the body, the legs, palps and antennae, while in the second the dorsum of the body, the legs and the palps were red, and the other pigmented regions a mixture of green and red, the two producing a dark brownish colour. The sixth nymph was vivid green except for its dorsum, which was brown, black and red in parts, and its palps and legs, especially the tibiae and apices of the femora, which were reddish. The adults were green except for the upper surfaces of the first two pairs of legs which were reddish in two specimens, and the dorso-lateral angles of the pronotum, which were a similar colour. In one specimen the edges of the tegmina were pink.

The nymphs were kept alive in a laboratory for three months, by which time three of them had reached the adult stage. The bright red colour of the newly captured nymphs gradually diminished and was greatly reduced at the next moult. The penultimate nymphs were the usual vivid green, only the tibiae of the legs, the dorso-lateral angles of the pronotum, the upper edges of the wing buds and the median dorsal longitudinal line of the abdomen remaining red. The adults were the usual colour except for the legs, dorso-lateral angles of the pronotum and the edges of the tegmina, which were reddish as described above.

Another unusually coloured nymph of *Caedicia simplex*, one instar younger than the Kelburn specimens, was found by Mr. R. Ordish, of the Dominion Museum. This had been feeding on chrysanthemum flowers. Its dorsum and limbs were a reddish colour and the sides of the body reddish olive. Medial black markings were absent in the specimen.

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The fact that the red nymphs were feeding on an unusually pigmented plant suggests that there should be some relationship between the red pigment of the plant and the red pigment of the insects. Although this may be so the two pigments are not identical. The red pigment of the plant may be extracted by heating fresh leaves first in absolute ethyl alcohol, then rinsing and heating in water when a brownish red pigment is obtained. This solution changes to a green colour when alkaline and to red when acid. The red pigment of a nymph, which had been stored in 70% ethyl alcohol for sixteen months, would not go into solution when heated in water and did not change colour in acid or alkaline media.

Adult specimens of *C. simplex* with tibiae, dorso-lateral angles of the pronotum and edges of the tegmina a brown or reddish-brown colour are often found, but as there have been no previous reports of bright red or unusually coloured nymphs, it is doubtful if the nymphs of such specimens pass through a "red" phase.

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References

Lysaght, Averil M., 1931. Biological Notes on a Long-horned Grasshopper, *Caedicia simplex* (Walk.) *N.Z. Jour. Sci. & Tech.*, XII (5): 296-303.

Ridgeway, R., 1912. Color Standards and Color Nomenclature. Washington D.C., Published by the author, pp. i–iii, 1–44, pls. I–LIII.

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