GYNANDROMORPHIC EARWIGS.

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While making observations on live earwigs, *Forficula auricularia*, an unusual individual attracted my attention. This earwig was peculiar in that one of the jaws of its forceps was of the male type while the other jaw was that of a female. In *F. auricularia*, as in most of the other earwigs, the forceps differ greatly in the two sexes.

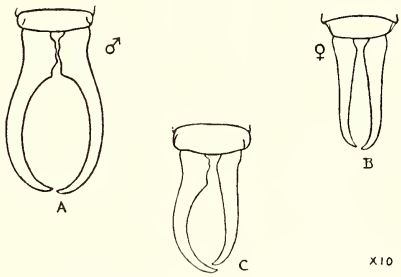

Fig. 1. A, forceps of adult male (long forceps variety) ; B, forceps of adult female; C, forceps of typical gynandromorph. The body lengths of all three earwigs whose forceps are shown in the figure were about the same.

As shown in figure 1, A, the forceps of the male have broad, flat bases with inner edges resembling irregular teeth. The distal portion forms board, caliper-like curves ending in sharp, pointed tips. There is a great variation in the length and curvature of the male forceps of *Forficula auricularia* which has been described by Bateson and Brindley.[1] This variation is dimorphic, ranging in forcep length about 3.5 mm. and about 7 mm.[2] These males with long forceps have been given the variety name of *forcipata* (Stephens).

The forceps of the adult females are nearly straight with their sharp-pointed tips curved inward (fig. 1, B). The bases are not as wide and flat, and the inner edges lack the tooth-like irregularities in outline seen in the forceps of males of this species.

Since several hundred dissections for cytological study have always shown the sex of the individual to be that indicated by the forceps, it was concluded that the abnormal earwig was a gynandromorph similar to those reported in other insect orders. A careful examination of about 3,000 earwigs of this species yielded 6 more abnormal individuals similar to the first. Figure 1, C, shows the forceps of one of these earwigs. The left jaw of the forceps is similar to that of the male, while the right resembles that of the female. This right jaw

[1] Bateson and Brindley. Proc. Zool. Soc. London, 1892.

[2] Fulton, B. B. Oregon Agric. Exp. Station Bull. No. 207, 1924.

"Proc. Ind. Acad. Sci., vol. 36, 1926 (1927)."

does not represent a portion of the nymphal forceps abnormally retained from the last instar stage. The instar forceps are much more slender with narrow bases.

The gonads were removed from all of the gynandromorphic earwigs and fixed for cytological study. From a superficial examination at the time of their dissection no conclusions could be drawn as to the irregularities in the morphology of the gonads and the accessory structures. At present I am unable to say whether or not this abnormal condition is accompanied by an abnormal histological development of the gonad, nor have I been able to show that the gynandromorphic forceps are associated with parasitized individuals. Several of these points may be cleared up after the material is sectioned. It is quite probable that gynandromorphic earwigs, especially in the species *F. auricularia,* are fairly common, but the fact that the abnormalities are not conspicuous in the field possibly accounts for their having escaped the attention of observers.

A NOTE ON THE MODE OF DISTRIBUTION OF EARWIGS.

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Interest in the habits of the European earwigs, *Forficula auricularia,* has recently been revived due to its infestation in the region of Portland, Oregon. Some observers, especially in the newspapers, have doubted the harmful effects of the earwig as a pest. Although these insects are probably blamed for damage they have not done, nevertheless their omnivorous habits and ability to live under the most adverse conditions mark them as being potentially harmful. Our native earwigs should not be indicted with the European species, from which they differ in many respects. In the feeding habits of the four native species studied in the laboratory I find them to be essentially beneficial since they show a preference for feeding on other insects.

How rapidly the European earwig will extend its range and whether or not it will ever become a common pest in our inland cities is a matter of conjecture. There is an extensive literature based on observations of this species. Several authors have discussed its means of distribution but apparently one mode has escaped their attention; that is, water.[1]

Especial attention was given to the above item during some laboratory observation on earwigs collected in the locality of Portland, Oregon. The European earwigs are very efficient swimmers, although they probably never take to this mode of locomotion except by accident. Experiments with *F. auricularia* showed it to float as readily as a piece

[1] Earwigs are known to be transported with objects shipped by boat but in this case the insects do not actually come in contact with the water.