119. Preliminary Note on a Special Type of Sex-abnormality in *Homoeogryllus japonicus*, de Haan (*Oecanthidae*).

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Since I reported a gynander of *Madasumma marmorata* in 1926, I have obtained about thirty or forty sexually abnormal insects belonging to Gryllodea, of which the far larger number I found in *Homoeogryllus japonicus*, de Haan. In these four years, in total twenty-nine such abnormal individuals of that species came under my examination. Four of them are typical bilateral gynandromorphs, which more or less bear the same characteristics as is described before (Ohmachi 1926). While, the remaining main part, twenty-five in number, is of quite different nature. Most of them are built on the same pattern (Figs. 2, 3); namely, they are, in a word, males with female tegmina. They have almost normal testes and male genital apparatuses, while the tegmina are quite female, though their venation is rough and prominent compared to ordinary females, expressing some traits of males.

In four individuals, I observed some deviations in the structures of the tegmina, namely both male and female characters are blended in that organ. In one individual (Fig. 4) the neurulation is almost female, but a small area is developed as the tympanum (Spiegel of German authors). In other two individuals (Figs. 5, 6), the nervures are almost male, but they are not completely developed and the size of tegmina is intermediate. In the last individual (Fig. 7), the size of the tegmina approaches almost to the ordinary male, but there are female traits in the neurulation.

With these observations, one is almost tempted to consider them as intersexes. Intersex, as is given its definition by Goldschmidt, is a sexual mosaic in time, namely an individual which, starting as one sex, turns to the opposite sex at a certain period in its development. The sexual organs of *Homoeogryllus japonicus* appear in the order of gonads, genital apparatuses, and tegmina. So that the above described abnormal sexes might be considered as intersexes starting as males, which turned

Fig. 1. Normal male and female.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

Fig. 7.

to females before the formation of the tegmina. The mingling of the male and female neurulation apparently seems to give further support to these supposition, suggesting that the "turning point" may be just before or during the formation of the Anlage of the tegmina.

But there are three individuals which critically decides the true nature of these special type of sex-abnormality. In these three, the mingling of the sexual characters is observed in the genital apparatuses, and their gonads are not always testes. In the first individual, the tegmina are of female characters, but a testis is found on the left side, while there can be observed no gonads on the right. The genitalia are very much complicated. The ovipositor of normal individuals is composed of two pairs of stylets (Gonapophysen), being appendages of the abdominal eighth and ninth segments, while the crasper of the male develops from rudimentary appendages of the ninth abdominal segment. In this individual, however, there is a pair of incomplete stylets of the ovipositor, which are attached to the eighth segment, while to the ninth segment is attached a left half of a crasper.

The second individual, the tegmina of which is also female, has a pair of ovaries. The genital organs are also complicated and the eighth abdominal segment bears a subgenital plate with a complete crasper, while in the ninth segment there develops a pair of rudimentary stylets.

The third individual has female tegmina and a testis on the right side, while there is an ovary on the left. At the end of the body, there is a half crasper on the right side, while, on the left side, there protrudes two pieces of the eighth and ninth segmental stylets, which are cut short. In all these cases the site of the genital organs is complicatedly metamorphosed.

In these three exceptional individuals, the mingling of the sexual organs are not according to the order of development. And when we take the whole conditions into consideration, it may be safely surmised that these special type of sex-abnormality is a kind of dorso-ventral gynandromorphism. It may also be noted that in these gynanders, the sexual characters are no more arranged always symmetrically than in the bilateral gynanders; for instance, the last described one is in reality a quarterly gynandromorph. It is also noteworthy that in these abnormal sexes the blending of the male and female characters in one organ is witnessed in the tegmina, and the intermediate condition resembles those intersexes such as reared experimentally by Goldschmidt. The intricacy of the genital apparatuses is, however, of spatial nature and not of intersexual origin.

The cause why there appear so much large number of these dorso-ventral gynandromorphs in *Homoeogryllus japonicus* is hard to decipher unless we ascribe it to a certain peculiar mode of segmentation in the early history of embryonic development.

A few words may be added as to the sexual instinct of these abnormal sexes. Most of these typical gynanders behave as males when a female is put near it. They extrude spermatophores¹⁾ and chase after the female. They raise their tegmina and violently stridulate them, but no sound comes as they are not furnished with sound-producing structures. As far as I have observed, no copulation is effected. These reactions are contrary to the bilateral gynandromorphs, which are inert.

1) I tried to insert these spermatophores in virgin females. Some of them laid many eggs. But, all the offspring are quite normal and no deviation also is observed in their sex ratios. Only an individual of abnormal sex appeared in a certain batch.