BIOLOGICAL NOTES ON *MEGACRANIA WEGNERI* WILLEMSE AND *M. ALPHEUS* WESTWOOD (Orthoptera, Phasmidae)

by

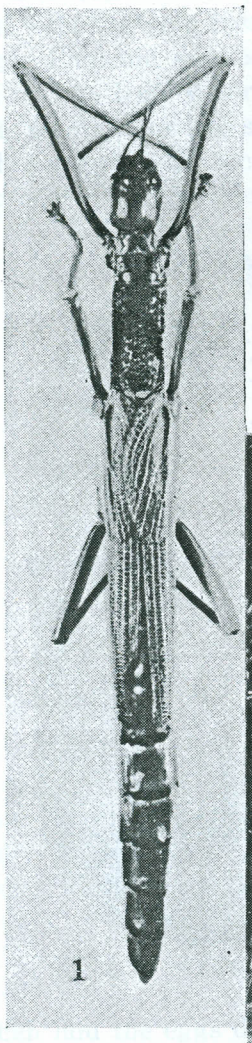
A. M. R. WEGNER
(Museum Zoologicum, Bogor, Indonesia)

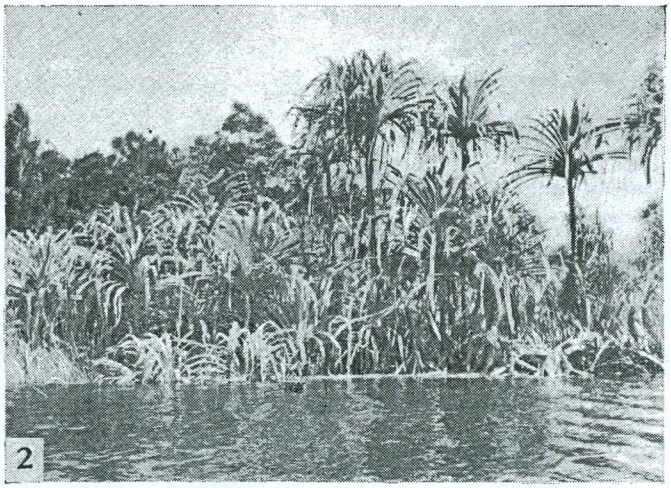
Megacrania wegneri WILLEMSE (pl. 3).

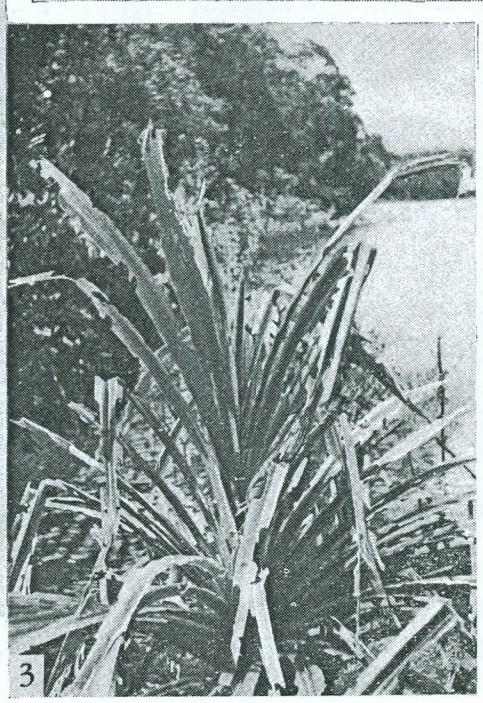
During our recent zoological expedition in 1953 to the North Moluccas, I visited the two islands Batjan and Obi. In the last-mentioned island our base camp was situated at the shore of the large and beautiful Obi Lake in the western part of the island, at a distance of about 4 km from the sea-coast, at an altitude of 160 m (pl. 3, fig. 2). Long stretches of the lake shore are fringed with a belt of water plants and a multitude of a Pandanus species, which latter dominates in some places (pl. 3, fig. 2). Most of the Pandanus are not higher than shrubs but they can grow up to 5 metres with a stem diameter of 15 cm. One day, when investigating around the lake, I found an extraordinarily coloured male example of a large Phasmid on a Pandanus plant. These insects are usually found on trees or shrubs and have a green, brown or greyish colour, while the body resembles a stick. This one, however, was very conspicuously coloured. Head, thorax and abdomen were bluish-green, the segments of thorax and abdomen being black-edged posteriorly; the antennae and legs were bright orange, the wing-base was reddish, while the coxae, trochanters and the distal parts of the tarsal segments were light green. At the moment of catching this remarkable animal, the insect emitted over its head, from the left and right side of the prothorax, a cloud of vapour which sprayed to a distance of about 50 cm, moistening my hand with a milky white, disagreeably smelling fluid. Astounded I pulled back my hand for a moment, then reached out again to take the animal from the rear. And now I got my second surprise! Before I could touch the phasmid, it again emitted two clouds of vapour, but this time in a backward direction, staining my hand with the evil-smelling substance. When I took the animal from the Pandanus leaf it ejected the fluid for the third time. But after that the gland containing the substance was apparently exhausted and no teasing would cause another ejection. No sound accompanied the ejection as is the case in the well-known bombardier beetle. Eager to know more about the insect's structure and behaviour, I took it to our camp for

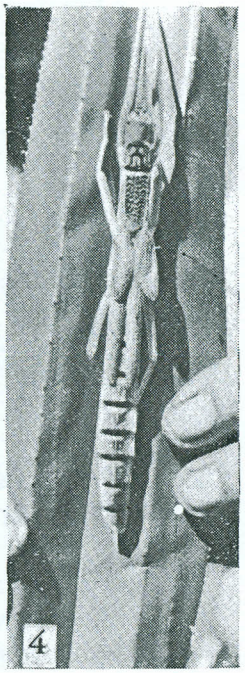
further investigation. The following was then noted. At the anterior margin of the prothorax on both sides there is situated, dorso-laterally, a crater-like pit, out of which in time of danger the animal pushes a dome-shaped membrane which shuts off the crater and acts as a nozzle. In that membrane there are two minute apertures, one of which is directed forward and the other more or less backward. By means of pressure of some muscle on the glands the insect is able to emit two sprays at will in a forward or in a backward direction, depending from which side the phasmid expects an attack.

Many Pandanus plants were investigated in search of this insect but no second specimen was discovered. Then I cut down a plant and tore it apart, leaf by leaf. In this manner I discovered its hiding place (pl. 3, fig. 4). The best way to ascertain whether there are animals in the leaf axils of Pandanus, is to take the plant apart which proved not so easy as it seemed to be. Pandanus leaves have serrated edges and midribs with sharp teeth and without the help of a long knife it is not advisable to take the leaves off the plant. Most inhabitants move towards the younger leaves for concealment. Only a kind of small crab was found living between the old leaves whose axils are often filled with the excrements of former inhabitants. After having taken off the old leaves I encountered a great diversity of animals. In the first place there were the stick-insects which, on being disturbed, were at once alarmed which they clearly demonstrated by their spraying. Generally they were living singly, but now and then I found a couple together, the male resting upon the back of the female. The male is quick in noticing danger and often tries to run away, whereas the female is slow and remains at its place. One morning, when going round on the lake in my boat, I came upon a cluster of Pandanus plants on one of which I saw a male and a female which had come out of their shelter and were sitting on the underside of a leaf near the top, the male upon the female. I approached in order to catch the pair, but as soon as I came near the insects stole away, creeping upon the upperside of the leaf, the male still holding its seat on the back of the female. From there they let themselves slide down on a lower leaf into their hiding place between the V-shaped leaf-bases. During my stay at the lake I obtained several hundreds of these animals so that I had ample opportunity to observe how fast they could travel forwards and backwards on a leaf. When gliding forwards they only used the anterior and second pair of legs, when gliding afterwards only the hind legs were moved. On another occasion I saw a male flying from one plant to another. Though the female also possesses wings, it cannot fly, its body being too heavy.









A. M. R. WEGNER
Biological notes on Megacrania wegneri Willemse

Fig. 1. *Megacrania wegneri*, WILLEMSE, ♀ allotype. Fig. 2. View of Obi Lake, with vegetation of Pandanus on the shore. Fig. 3. Pandanus plant, infested by *Megacrania wegneri* WILLEMSE. Fig. 4. Unfolded leaf of Pandanus, showing hiding-place of *M. wegneri* WILL.

Between the axils of the leaves I found the eggs, which are very large even for this insect, in fact they are twice as large as the eggs of bigger Phasmid species (fig. 1). Not more than one to two eggs where laid on one leaf. Whereas Phasmid eggs which I had hitherto seen had always a more or less spherical form, the eggs of this species were oblong with somewhat flattened underside and sides. The top is provided with a stopper-like cap which is pushed off when the young phasmid emerges.

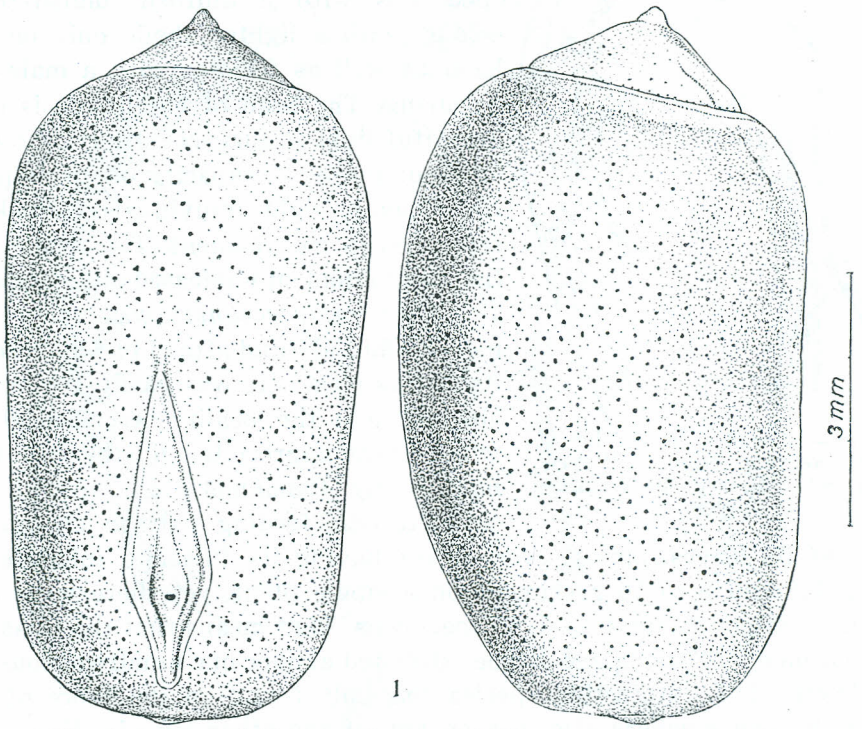


Fig. 1. — Egg of *Megacrania wegneri* WILLEMSE, lateral aspects.

When laid the eggs drop down the tunnel-like trench of the leaf and are stopped in their course by the stem of the plant, so they can never fall to the ground or into the water. A freshly emerged young phasmid (fig. 2) measures already 31 mm from tip of head to end of cerci; with the outstretched fore legs included it measures 49 mm. A female imago measures 130 and 190 mm, a male imago 110 and 165 mm, respectively. When still in a larval state the young phasmids are already in possession of a well-developed bombardier equipment. A female is able to eject the substance up to 75 cm, the considerably smaller male spouts as far as 50 cm. And this weapon seems to be very effective against any attacker, which is

proved by the fact that I never found the remains of chitinous parts of these phasmids between the leaves, whereas I often noticed those of other Pandan-infesting insects.

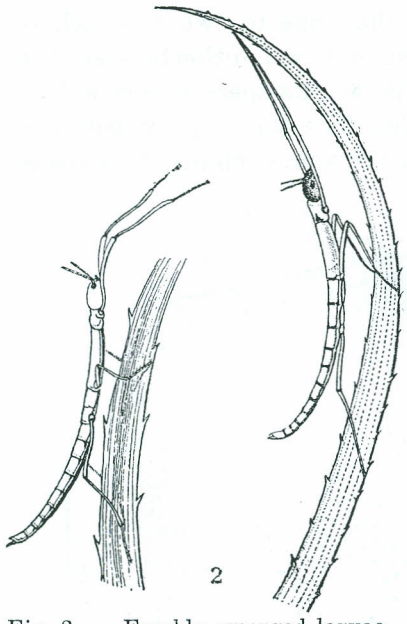


Fig. 2. — Freshly emerged larvae of *Megacrania alpheus* WESTW. (left) and of *M. wegneri* WILLEMSE (right).

The colour of the male is much brighter than that of the female. There is no variation in the colouring of male individuals, whereas in the female I encountered specimens with a uniform bluish-green colour (with a lighter shade only on the legs) as well as females with a male-like colouring. The head of the larvae is of a beautiful light orange colour. In order to find out the daily capacity of an ovipositing female, eight individuals were kept separated in confinement. The result was that one animal only released one egg daily.

Megacrania wegneri was very common at Obi Lake and after I had discovered its hiding-places, it was easily found. Its abundance at the locality described above will be best appreciated by the fact that hardly any Pandanus was without the characteristic feeding pattern on one or more of its leaves, almost every plant having its Phasmid inhabitants. Often I found 5 to 10 specimens on a single plant, yet there were also plants on which I found up to 18 specimens. That means that the Phasmid population at the lake alone can be estimated at over one hundred-thousand specimens. This interesting species was only found on the shore of the Obi Lake and nowhere else, nor on any of the other islands. Elsewhere in Obi I collected an allied species, namely *Megacrania alpheus* WESTWOOD.

Megacrania alpheus WESTWOOD.

After having finished our investigation of the attractive Obi Lake, we moved to the coast and from there went by prahu to a place called Kasowari, which is situated at a distance of about 30 km to the south. There we made camp to stay for a while. When exploring the surroundings of this place, I frequently came upon Pandanus plants which, here in the lowlands, were growing chiefly at the sea-coast. As I had found the highly interesting bombardier phasmid on a similar kind of plant, my interest was naturally concentrated on the question whether or not this insect

would also occur on Pandanus near the coast-line. Many plants had already been inspected when I eventually came upon a cluster which showed the unmistakable signs of being infested by phasmids. And sure enough some of the insects were soon found but at the same time I immediately noticed that this was not the same species as the one found at the lake.

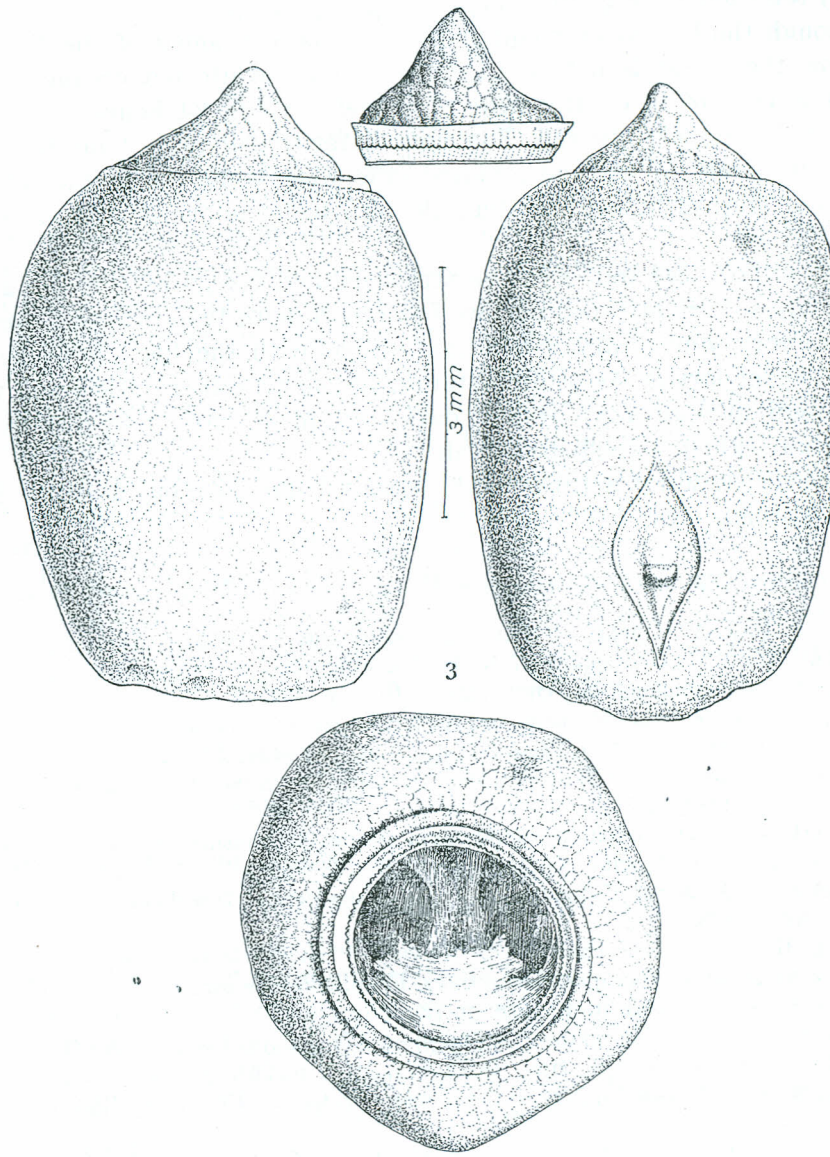


Fig. 3. — Egg of *Megacrania alpheus* WESTWOOD, showing loose operculum, lateral aspects, and dorsal view, the operculum removed.

The following notes may serve to its recognition.

A much less conspicuous insect with less bright colours: uniform green without blue-green, orange or red tints; legs somewhat lighter green. Wings of adult ♀ considerably shorter than those of *wegneri*. Thoracic and abdominal segments not bordered with black posteriorly. Size smaller, total length 122 mm.

Though the bombardier equipment and the evil smell of the fluid is the same, the colour is not, as in *wegneri*, pure white but creamy. Five females were kept in confinement separately during 24 hours, in which time each female laid one egg. The eggs differ considerably from those of *wegneri* in being shorter and coloured otherwise, while the surface of the egg is not smooth but granulated, the cap being adorned with a sharp spine (fig. 3).

The differences found in the structure and colour of the egg alone are already sufficient proof that we have to do with two different species.

The very young larvae are light green with the head light yellow (fig. 2). Older larvae are often different in colour, either dark green with the abdominal segments dorsally dark brown, or dark brown with the abdominal segments reddish laterally.

Notwithstanding a three days' search I did not find a single male of this species.

Literature on the defensive glands found in *Phasmidae*.

AUDOUIN, J. V. & A. BRULLE. — Hist. Nat. des Insects, 9, 1835.
BLATCHLEY, W. S. — Orthoptera of N. E. America, 1920, p. 145.
CHOPARD, L. — La biologie des Orthoptères. 1938, p. 361.
GOUDOT, J. — Description de trois nouvelles espèces d'Orthoptères de la famille des phasmiens. Rev. Mag. Zool. 13, 1843, p. 125—130, Pl. 125.
HAASE, E. — Über die Stinkdrüsen der Orthopteren. Sitzb. Ges. Naturf. Freunde Berlin, 1889, p. 57.
MAYNARD, C. J. — The defensive glands of a species of Phasma, *Anisomorpha buprestoides* from Florida. Contrib. Sci. I (I), 1889, p. 31—35. Illustr.
SAY, THOMAS. — American Entomology or Descriptions of the Insects of North America, 1824—1828.
SAUSSURE, H. DE. — Recherches zool. p. servir à l'histoire de la faune de l'Amérique centrale et du Mexique. Orthoptères. Famille des Phasmides. 1870, p. 136—137.
SCHRÖDER, C. — Handb. Ent. 1, 1928, p. 18.
SCUDDER, S. — Odoriferous glands in Phasmidae. Psyche, 1, 1876, p. 105—106.
SHARP, D. — Cambridge Nat. Hist. Insects, 1, 1895, p. 264.
STEWART, M. A. — Phasmid injury to the human eye. Canad. Entom. 69, 1937, p. 84—86.