

Some remarks about the supposed scent-organs of the Genus *Opsiphanes*,

by

J. H. JURRIAANSE.

(Read June 16th 1923.)

Plate 2.

Last April I received from a steamer, discharging bananas from North Columbia in Rotterdam, a male *Opsiphanes tamarindi sikyon* FRUHST.

The chrysalis that must have been among the bananas, had emerged and thanks to the fairly low temperature in the holds, the butterfly never flew and was practically undamaged.

The Genus *Opsiphanes* belongs to the family of *Brassolidae* which has secondary sex-markings carried by the males. With *Opsiphanes* they consist of brush-shaped pencils of hairs on the upperside of the hind wings and a naked patch with a little central organ at both sides of the abdomen, the latter not being very conspicuous on dried specimens. We know that it is there and that seems to be sufficient.

After killing the animal with an injection of *Ammonia liquida*, I noticed when setting the butterfly, that the pencil on the submedian nervure. (S. M.), seemed to be drawn out of said little organ, which I will call the „gland” in future.

As soon as the hairs had left the gland, they spread out in their usual star-shape.

It is to be understood that in their natural position those pencils are situated opposite the glands when the wings are at rest, enclosing the abdomen nearly over its full circumference. When the butterfly is being set the wings are pulled up in a more or less unnatural position, with the result that the abdomen is fully uncovered.

Regarding the little organs or glands on the abdomen, I might observe, that at both sides of the fifth segment is a bare, waxlike patch of about 7 millimeters long and 2.5 millimeters wide, pointed backward and more or less rounded in front. In the middle of this patch we find an egg-shaped

dull patch pointing to the anus. Behind the point is found a little round patch, much smaller. The whole resembles a swollen point of exclamation of about 3.5 millimeters long. The colour is red-brown and seen under a magnifying glass, it is covered with a large number of membrane-like projections. The edges of those organs are a little higher and are probably surrounded with projections that are a little longer and stiffer, which gives the organ a dish-like shape.

The fortunate and most extraordinary occurrence of being able to observe a living male specimen of *Opsiphanes tamarindi sikyon* was so valuable to me, that I decided to examine those glands more closely. The impossibility of examining them without detaching the organs from the abdomen, made me decide to amputate them and thanks to the kind permission of Dr. H. BURGERHOUT, Director of the Corporation Hospital in Rotterdam, Miss A. LEBRET made (under supervision of Dr. J. HULSHOFF POL), a large number of microscopic slides, which allowed a closer examination.

During the research it was necessary to have more material at my disposal and for this reason I decided to sacrifice also the abdomina from *Opsiphanes cassina periphetes*. FRUHST. and — *numatius*. FRUHST. Both varieties belong to the same genus as — *sikyon*, having the same morphological properties.

I will not speak here about the difficulties encountered in making the microscopic slides but will give a short report of my observations. Before describing the organs in question, I want to recapitulate that the normal skin of the butterflybody consists of three layers. The outside, epidermis or chitin layer, is built up by the hypodermis underneath it, the latter consisting of one or more strata of cells with nucleus. This layer is covered on the inside with a basement membrane.

The organ in question is formed by a local dish-shaped projection of one of the chitin abdominal segments, covered on the inside with a thin hypodermis. The chitin in this place differs from that in other places in that it is much thinner there. The hypodermis consists, in accordance with the other parts of the inside covering, of a layer of flat cells with spool-shaped nuclei. A basement-membrane can be found also. Underneath this hypodermis a layer of large cells is observed.

All those layers are supported by a rather coarse and loose tissue with larger and smaller spaces as is found everywhere in the abdomen and serving as a support for the other organs.

The layer of cells under the hypodermis is of a quite different structure. They are very large, each with a moon-shaped nucleus, curved round the cup with stem that will be described presently. Attention is specially drawn by the form and implantation of the projections that could be seen with the magnifying glass.

The thin chitin cover, under which the hypodermis and large cell-layer is found, shows a great number of deep circular impressions in the shape of a cup with stem. The stem being hollow and open at the bottom. Each of these stems is enclosed in one of the large cells mentioned above. These apparatus form the implantation-sheath for the membranelike projections, which we will call here on account of their peculiar shape „calyces” (flower buds).

These calyces are quite different in shape to the scales and hairs found on the abdomen.

With a fine tube they fill the stem of the chitin cups and thus have also a direct connection with the inside of the cell. In the wider part of the cup they unfold partly and form outside it a large bud-shaped calyx that resembles more or less a partly opened crocus flower, of which the inner surface is smooth and the outside ribbed in the longitudinal direction with thin and sharp ribs.

The dimensions of those different parts are approximately:

Length of the chitin cups 60 micra,
diameter of same 30 micra,
total length of the calyces 300 micra,
diameter of the calyx stem 3 micra.

Plate 2 gives a schematic view of one of the organs described above.

This illustration is made on the basis of a large number of microscopic slides.

If we summarize the results of the microscopical researches, to arrive at an explanation of the functions of said organ, the importance of two parts of same claims our special attention. In the first place the presence of the large cells that are not found anywhere else in the abdomen and in the second place the calyces implanted by means of chitin cups in same.

As to the first; what conclusions can we draw from the anatomical qualities of those cells, that are no doubt specialised for this organ.

Dr. HULSHOFF POL believes that we are dealing here with a gland-epithelium.

Secondly; the implantation of calyces in these cells makes us expect a certain connection between these calyces and the gland-epithelium.

It seems quite clear that this connection cannot be any other but the pouring out of the gland-secrete in these calyces, which come in-direct contact with the hair-pencil on the wing.

Putting all these facts together, I think I may say with confidence that we are dealing here with a beautiful scent-distribution organ of which the functions are as follows:

The sexual attraction mechanism of the male butterfly consists of three leading functions, viz.

- 1st The secretion of the scent by a gland at each side of the abdomen.
- 2nd The ejection of same over a special contact-organ, consisting of bud-shaped projections implanted in those glands.
- 3rd The distribution of the scent in the air derived from those projections by the contact of a hair-pencil on the wing.

I cannot conclude this short publication without expressing my great gratitude to my friend Dr. J. HULSHOFF POL, who was kind enough to give me very valuable information regarding the cell-structure visible in the microscopic slides. Without his cooperation much would have remained dark to me.

The genus *Opsiphanes* has still another sex-mark that is clearly visible in the shape of a second hair-bush on the upperside of the hindwing. It is situated at the underside of the cell just opposite the first median nervule (M 1).

At a few millimeters distance from the basis, said median nervule forms a pocket or fold in which the ends of this hair-brush are enclosed. Probably those hairs get out of this fold during the flight, distributing in the air the scent, (if any) contained therein. The researches about this organ are not yet completed to an extent far enough to come

to a reliable conclusion especially as it is very difficult to obtain fresh material.

I use this opportunity to ask for the assistance of Central American Lepidopterologists to obtain fresh material of *Opsiphanes* in the shape of eggs, caterpillars or chrysalis and shall be glad to cooperate with them in order to bring more light on this highly interesting subject.

A new form of butterfly from Tenimber

by

J. H. JURRIAANSE and G. VOLBEDA.

In the collection JURRIAANSE is a series of *Cynthia erota* F. from Tenimber, that differs from *Cynthia erota cycnia* NICEV. from the Key Islands as follows:

Males, upperside: even dark ochreous, black markings less prominent, whitish patch on costal part of hind wing smaller and only a little lighter than the ground colour.

Underside: the sub-marginal part of the wings is over a much larger area more intense purple. The whitish patch on costal part of hind wing smaller and a little darker.

Females, upperside: ground colour more ochreous, the discal band not whitish yellow but light ochreous and the same colour as the submarginal part. The black markings less prominent and not so sharply drawn. The basal part of both wings lighter.

As to the light patch on costal part of hind wing, the same as with the males.

Underside: the discal whitish band is less prominent and has nearly the same colour as the sub-marginal part. No further remarks except what has been said about the males.

11 ♂♂ and 5 ♀♀ from Olilit-Saumlakki, Tenimber Islands.

As we consider this form to be a new one, we propose to name it *Cynthia erota vanroesseli*, subsp. nov.

Rotterdam, 29th Aug. 1923.



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