

OBSERVATIONS UPON SPECIES

OF

CURCULIONIDÆ INJURIOUS TO CYCADEÆ,

ESPECIALLY

TO PLANTS OF THE GENUS ZAMIA,

by J. O. Westwood M. A., F. L. S. etc.

— SÉANCE DU 7 AOUT 1886 —

In the autumn of last year I received from Monsieur J. Ch. Puls of Ghent a very interesting communication concerning certain Coleopterous insects which he had found to be injurious to species of *Zamiæ* cultivated in the serres of that city. For several years previously he had found the *Phæccorynus Zamix* of Gyllenhal (Schön., p. 963), attacking the Cycadææ, but at the date of his communication (7. August 1885) he wrote to me : « Aujourd'hui je trouve un autre insecte qui détruit l'intérieur des Cycadées, celui qui est ci-joint a été trouvé dans le *Zamia villosa* dont les larves ont entièrement détruit la plante et font de grands dégâts dans la serre. Vous m'obligeriez en me faisant connaître si le nom est exact et quel est le nom de l'autre espèce. » Subsequently M. Puls was so obliging as to send me a plant of the *Zamia* attacked by the insects with specimens of both the latter species together with the of his second species.

The first mentioned insect was correctly named by M. Puls as the *Phæccorynus Zamix*, a Weevil belonging to the group of Calandrides, of an obscure black colour more or less varied with red spots on the elytra or with the elytra obscurely ferruginous covered with minute black dots; in the middle of the pronotum or dorsum of the prothorax is a small velvety black oval spot and another small and posterior is just in front of the scutellum; this may possibly be a sexual character as there are some specimens in which they are wanting, where, however, they may possible have been rubbed off. In all the individuals of *Phæccorynus Zamix* sent to me

by M. Puls the ventral surface of the abdomen is not concave, but the centre is flat, glossy and punctured.

In the *Gardener's Chronicle* for 1870 (p. 699, 21. May) the late M. Andrew Murray published a notice with figures of a species of Weevil, to which he gave the name of *Phacecorynus funerarius* which appears to me to be merely a black variety of *Ph. Zamia*, judging from typical specimens of the latter insect in the Hopeian collection at Oxford under my charge, (in which the Curculionidæ were, to a large extent, named by Schönherr). Mr. Murray's insects were found infesting a number of different species of *Encephalartos* lately imported from the interior of South Africa, 300 miles from Natal by Mr. Bull, « some of which were found in an unsatisfactory state, the stem being soft, with the scales loose and easily detached; on pulling them off it was seen that the whole was absolutely riddled by a white grub about a third of an inch in length. By-and-by a number of black Weevils appeared each about half an inch in length, » which Mr. Murray described and figured under the name given above. « The stems of the *Zamia* and *Encephalartos* are composed of a heart or core composed of reticulations of hard woody matter with interstices filled up with cellular tissue very much as the structure of the rhizome of a Fern surrounded with a covering of large scales more or less imbricated like the core of or Firtree or the fruit of a pine apple. In the exterior lozenge shaped apophysis of these scales in the attacked plants a small round hole is here and there to be observed —; doubtless a door of exit made by the perfect insect in coming out. It is too large to have been a door of entrance made by the young larva and the texture of that part of the scale is apparently too hard for its jaws. Inside I found grubs in all stages, in smaller numbers in the core of the stem but very abundant in and about the scales. In pulling the scales asunder, the fat, well fed, little pig-like larvæ dropped out in numbers from the holes or galleries they occupied. Their borings ran in every direction right through scale after scale — after I had secured every visible grub and nothing remained but a pile of apparently riddled empty scales I found that almost every one of them contained either one or two grubs at work well up in its interior. — The soft farinaceous-looking interior of the scales of the *Encephalartos* crumbles into a reddish granular debris through which these larvæ eat their way; and I see that they have a way of backing a little every now and then with the recurved hooks in a vertical position which leads me to suppose, that their use is to push back the debris behind them. They do not seem to be used in assisting progression although no doubt they do give a leverage, when applied against the walls of their borings, but the larvæ do not need any assistance of this kind. If laid on the table, notwith-

standing the absence of feet, they walk off at a good pace solely by the vermicular motion of the segments of the body » (Murray, loc. cit. »

The larvæ of the *Phacecorynus funerarius* is thus described by Mr. Murray (whose observations and descriptions are here quoted, as the *Gardener's Chronicle* is not a work in the hands of many Entomologists).

« Larva wrinkled, fleshy, yellowish white. Head oblong, corneous, light brown, mouth directed downwards. The cephalic plate behind the labrum has six or eight depressions (in a double series) in the middle and two irregular ones on each side near the anterior margin; no ocelli; no antennæ; clypeus short and transverse, labrum broadly trilobed, mandibles robust, rounded towards the point; the underside concave without basal teeth, but with one or two slight elevations not large enough to be called tubercles, along their posterior edge; maxillæ far apart, each almost a fleshy column, most developed on the inner side, bearing on the external angle a short palpus, consisting of two articles, of which the lower joint is tumid, the terminal one minute and pointed; mentum triangular, with the base of the triangle in front, canaliculated in the middle; front with a slight projecting tooth on each side of the middle, and bearing on each side on the external angles a somewhat tumid palpus, consisting of two small articles. Thoracic and abdominal segments all well separated from each other and very wrinkled, the first thoracic segment with a corneous pale yellowish-brown plate along each side of the back, the last segment with two recurved fleshy hooks projecting upwards, yellow and slightly corneous at the tip. Stigmata nine on each side all distinct and easily seen, the first twice the size of the rest placed close to the inferior angle behind the head. Feet none. » I have given out-line copies of Mr. Murray's figure of the larva and its details.

An elaborate 4^o memoir by Dr Hermann Burmeister was published in 1837 with the title : « *Zur Naturgeschichte der Gattung Calandra nebst Beschreibung einer neuen Art, Calandra Sommeri* » illustrated by a plate containing full details of the external and internal anatomy of the species in all its states. This new species infests the *Encephalartos Allenstenii* Lehm. at the Cape of Good Hope. The perfect insect is 10 lines long and is described as « *Nigra pronoto vittato : elytris punctato-striatis, stria secunda et tertia puncto post medium luteo-fusco.* » — The species is very closely allied to *Ph. Zamia* and *funerarius*, having the ventral surface of the abdomen concave and flattened. These species do not appear to form a cocoon of the twisted fibres of the stem or grains of the plants on which they feed as is the case with *Calandra palmarum*

(*C. Sacchari* of Lansdown Guilding and *Sphenoph. liratus* Schön., which feed on the sugar cane and of which the larvæ have the body terminated by a simple single rounded segment). The larva of *C. Sommeri* is represented by Burmeister as very robust and convex, the dorsum much arched and the body terminated by two porrected horny points. A copy of the figure of the larva of *C. Sommeri* is added to my plate.

Fifty years ago I noticed in the Museum of the College of Surgeons of London another larva of this genus having two points at the extremity of the body, more obtuse than those of the larva of *C. Sommeri*, but Mr. Murray states that he was not able to find the specimen to which I alluded, in that collection.

The second species of Curculionidæ sent to me by M. Puls together with specimens of its larva and a stem of the plant which it infested in considerable numbers, proved, on careful examination, to have no immediate relationship with the Calandrides but was much more closely allied to the Otiorynchides especially, in size, colour, form of rostrum and general appearance to the Genus *Iphippus* of Schönherr, III, p. 248, which comprises insects from New-Caledonia, New-Holland (and one from Brazil), leading to the supposition that M. Puls' species was not an inhabitant of South Africa, and on submitting a specimen of it to Mr. Pascoe who has made an especial study of the exotic Curculionidæ, he at once informed me that the insect is the species which he had previously described under the name of *Traues* (Schön. VII, p. 129) *internatus* (which is a native of Queensland, Western Australia) described by himself (Trans. Ent. Soc. London) 1870, p. 199), as follows :

« *T. oblongo-ovatus, paulo depressus, niger subnitidus; capite rostroque basi sat fortiter et confertim punctatis, oculis infra contiguus; prothorace utrinque antice valde, postice minus, rotundato, in medio linea angusta subobsoleta notato; supra crebre sat fortiter punctato, punctis setuliferis, scutello subrotundato basi constricto: elytris fuscis, prothorace basi paulo latioribus sulcatis, sulcis catenato-punctatis, interstitiis latis, convexis corrugato-punctatis, setulis minutis valde adspersis; propectore emarginato, margine aureo-ciliato, corpore infra nitido, remote punctato, punctis setuliferis; femoribus crassis, infra excisis, non dentatis Long 5 lin. »*

On communicating this information to M. Puls, he replied to me : « De nouvelles recherches faites me l'ont fait découvrir dans le *Zamia corallipes* Hooker qui est originaire d'Australie, ce qui confirme votre opinion, que l'insecte était australien. On m'assure que c'est d'Australie qu'arrive l'insecte, car les horticulteurs n'osent plus acheter certaines variétés australiennes parce qu'il est rare de

trouver des plantes saines dans la variété. L'insecte parfait se trouve le jour dans la partie végétante formant le cœur de la plante. — Quant aux dégâts, ce sont identiquement les mêmes que ceux du *Phaccorynus funerarius* Murr. » — In the accompany figures I have represented various portions of the stem of the *Zamia corallipes* shewing the injurious ravages of the larva with the cylindrical burrows in which they reside.

The larva of *Tranes internatus* is of a creamy white colour with the head chesnut brown, the mandibles and lower part of the mouth brownish black. The segment of the body following the head has on the upper side two broad clear-brown plaques of a horny consistence. This larva is of a much more cylindrical form than that of the larvæ of the *Phaccorynus*, the body generally somewhat arched; it is destitute of legs the underside of the first three segments with two or three short bristles which are also shewn in Burmeisters' figure of the larva of his *Cal. Sommeri*. The mandibles are very strong, triangular and acute at the tip, below which is a notch forming a small sharp tooth; the maxillæ are broad, flattened and rounded at the tip where they are armed with short obtuse spines; the maxillary palpi are very short and two-jointed. They are connected with the lower tip by a broad membrane. The mentum is small obtriangular with the middle of the fore margin produced in front, pointed behind, the anterior angles form two broad joint, like pieces; the labial palpi are very short and two jointed. — The spiracles are nine pairs in number, the first being the largest and placed on the segment next the head; the second and third segments are destitute of spiracles, and the fourth and seven following segments have one on each side of the body.

The body is much wrinkled and the terminal segment is entire without any tubercle or projecting appendages.

The perfect insect varies from 10 to 12 millimetres in length, exclusive of the rostrum which is about the length of the pronotum. The antennæ are 9-jointed, the long basal joint being lodged, when at rest in two grooves extending on the underside of the rostrum quite to its base as shewn in my figure.

DESCRIPTION OF THE FIGURES.

FIGURES A 1 — 14.

Tranes internatus.

FIG. A 1, 2, and 3. Portions of the stem of the Australian *Zamia corallipes*, shewing the burrows and ravages of the larvæ.

- A 4. The larva of the natural size.
- A 5. The larva magnified.
- A 6. Head of the larva seen in front.
- A 7. The front of the head of the larva shewing the labrum and mandibles.
- A 8. The labrum separately.
- A 9. One of the maxillæ detached.
- A 10. The maxillæ and lower parts of the mouth, in situ.
- A 11. *Tranes internatus*, imago, natural size.
- A 12. The same magnified.
- A 13. The head of ditto seen from below shewing the antennal grooves.
- A 14. Antenna of ditto.

FIG. B.

Larva of *Calandra Sommeri*, from Burmeister.

FIG. C 1 — 3.

Larva of *Phæcecorynus funerarius*, after Pascoe.

- C 1. The larva magnified.
- C 2. The same natural size.
- C 3. Extremity of the body of ditto.

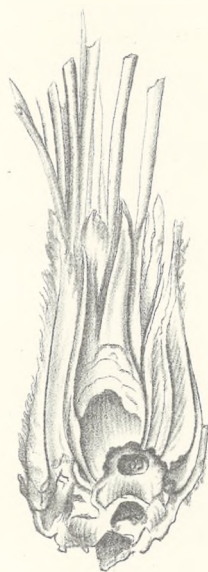




A 1



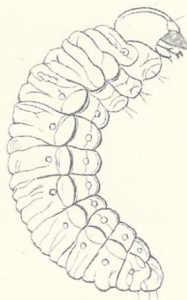
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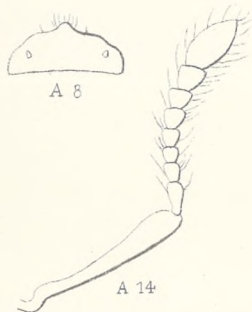
A 2



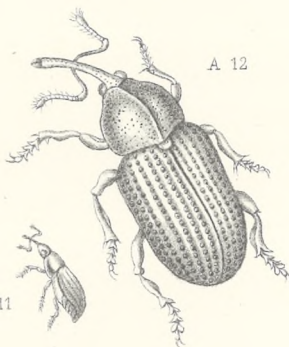
A 4



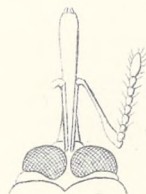
A 5



A 8



A 12



A 13



A 11



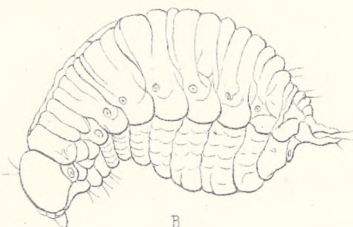
A 6



C 2



A 7



B



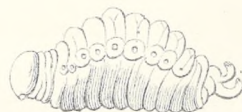
C 3



A 10



A 9



C 1



