

XXII. *The Hibernation of Marasmarcha.* By T. A.
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[Read October 2nd, 1907.]

PLATE XXVIII.

I HAVE found a good deal of interesting matter in trying to work out the less-known items in the life histories of our British Plume Moths, with a view to assisting Mr. Tutt in making as complete as possible his account of that group in his "British Lepidoptera." Amongst these points, the question as to how each species passed the winter was one, to which the answers varied somewhat in each species and made the research very attractive.

With regard to a good many species much was already known, though often in a rather vague way, such as the hibernation of the imago of *monodactylus*, of the full-grown larva of *microdactyla*, and of the half-grown larvæ of most of the *Acipitiliines*.

Amongst the additions to our information, we have found that most of the *Platyptilids* hibernate (in the interior of the food-plant usually) in the second instar. The hibernation of *lithodactylus* as an egg, or more accurately, perhaps, of the young larva within the egg-shell, was something of a surprise, and so on.

There is not much difficulty in following out such observations, if sufficient material can be obtained, but *Marasmarcha lunædactylus* (*phæodactyla*), a fairly common species, of which plenty of material was available, defied our (Bacot and others as well as myself) efforts to discover how it passed the winter. I got moths to lay their eggs on growing plants, and afterwards found the empty eggshells, but no traces of their larvæ. I placed the newly-hatched larvæ on living plants and tried to follow them in their travels, without success; only this summer I placed a number of larvæ in a sleeved plant, and later found that eggs had been laid and larvæ hatched, but a careful dissection of the plant and examination of it, above and below the soil, was without result. This seemed, however, to

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quite disprove the suspicion that the larva followed Platyptiliid habits and reached the second instar in autumn, but, except for this guess, it left us in the position stated at length in Tutt's "British Lepidoptera," Vol. V, pp. 391-3.

It has given me, therefore, great satisfaction to have succeeded at length in solving this problem, which had puzzled us so much, and the satisfaction is the greater in that the solution is rather unexpected and certainly somewhat extraordinary; nor is it much diminished that the clue to it was afforded in an almost accidental manner.

Marasmarcha tuttidactyla (or *agrorum*, var. *tuttidactyla*) was found commonly at Gavarnie, and a ♀ laid some eggs. These were placed in a glass tube quite alone, under a sort of general idea that something might be done with them if they would refrain from hatching till I got home. However, when I got home they had not only hatched, but most of them had made their arrangements for the winter. Having no better place in which to do it, they had wedged themselves between the glass and the paper covering the cork and spun themselves small cocoons of white silk, several together. The latter circumstance is no doubt accidental, as naturally the eggs are laid singly, and is therefore due to there being practically only these spots available to them. [Pl. XXVIII, fig. 5.]

I was naturally anxious to ascertain whether *phæodactyla* had precisely the same habit. This seemed almost certain from the similarity of the species, and that the larva of *phæodactyla* certainly hibernates very small. I therefore examined with great care the potted plant of *Ononis* already referred to, on which I had left sleeved a number of larvæ of *phæodactyla* on leaving home. The experiment was so far successful that I found a number of empty egg-shells on the plant, but I failed utterly to find the young larvæ in their cocoons, although they were almost unquestionably there somewhere.

Very luckily I picked up about mid-August on our downs a very belated ♀ *phæodactyla*, who very kindly supplied me with a moderate store of eggs. These I divided into two portions. One I placed in a glass tube with a dead leaf or two of *Ononis* and some portions of glass slide covers; the other I put on a comparatively

small piece of *Ononis* with a bit of root, which I put in a glass jar in clean sifted sand.

These hatched in due course. About August 29th those in the tube spun themselves cocoons exactly like *tutti-dactyla*, between the slide covers and bits of leaf and between the glass of the tube and bits of leaf. A bit of leaf seemed much more to their taste than two glass surfaces.

On September 6th I examined the piece of plant in the sand, and at first was very unsuccessful. By searching on the plant above ground I could find nothing, then on that below I was equally unsuccessful. I finally, however, succeeded in finding half-a-dozen cocoons. These were found, as regards at least four of them, in the sand, with some attachment to dead leaves of *Ononis* that were on or partially buried in the sand; the two others were probably in similar places, as, though free in the sand when I found them, it was at the same time as I found the others, and a search in the sand all round the plant afforded no others. [Pl. XXVIII, figs. 1, 2, 3.]

Later, however, having waited till the sand was quite dry, I carefully sifted it, and obtained by so doing eight further little cocoons, minute aggregations of sand particles on that side with the cocoon in the midst. [Pl. XXVIII, fig. 4.]

These cocoons had sand attached to them, so that the contents were not easily seen. But those built against glass were so thin on that side that the glass formed practically the wall of the cocoon. The cocoon is of course very small, and the larva is coiled up in it, so that it occupies hardly more space than it does in the egg.

The larvæ of *Marasmarcha* (*phæodactyla*, *fauna*, *tutti-dactyla*) always occur on plants that form a considerable mass, and I imagine that the young larvæ form their hibernating cocoons amongst the dead leaves and other material of the plant close to the ground, and not on the plant itself, but have, owing to the density of the plant, little difficulty in finding a growing point when they come out in the spring.

The examination of the piece of *Ononis* planted in sand, as well as the futile searches made on previous occasions, make me feel certain that the little cocoon is never made in touch with the living plant, but somewhere sufficiently close by. It is so small that one might easily

go on for years experimenting on plants growing in an ordinary way in a flower-pot without being able to discover it, and easily explaining our previous want of success.

This habit of hibernating as a newly-hatched larva, without feeding, is quite new amongst the Plume Moths; it is extraordinary, indeed, that such a minute larva should be able not only to pass the winter before eating, but should also be able to afford to secrete silk and spin a cocoon. I cannot remember, indeed, any other similar case amongst the Lepidoptera. The Argynnis and Satyrids afford some larvæ that hibernate before feeding, but they spin no cocoon. Many young larvæ, however, are fully formed before winter within the eggs, and pass the winter there before hatching. We may assume that an egg-shell is a better protection for the winter, under most conditions, than a cocoon, or the habit of hibernating within it would not be so much more frequent than the one I have just related as occurring in *Marasmarcha*.

EXPLANATION OF PLATE XXVIII.

[See *Explanation facing the PLATE.*]

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