

On the Biology of *Evetria turionana* Hübner

(*Lepidoptera: Tortricidae*)

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(With 4 textfigures)

In entomological literature, as well as after all in the literature of other biological disciplines, it occurs rather frequently that some gaps in observations carried out in nature are provisionally filled by facts reached on the way of deduction. Sometimes such gaps when concern rather short spells of time or fragments of not outstanding character, are simply omitted through a slight shift of dates of border phenomena. The picture presented in such a way is not quite identical with reality, though it enables to approach studied problems in some complex. With the course of time these artificial elements of the elaboration should be, of course, replaced by an empirical material. Not always, however, the gaps in the research and the way of their filling up or neglect are sufficiently and distinctly indicated and one can hardly evaluate what is still left for explanation or verification. It takes place more particularly when the work on a problem based on such not full and not wholly uniform material is supported by the authority of experienced research worker. In such case the biological correction of the information one some field comes with a significant delay and often is a matter of some incident if so could be called an observation gained in the course of the research carried out in somewhat different direction.

Such was the case in the connection with our study of *Evetria buoliana* SCHIFF. in which a part of our attention was paid also to species accompanying and related to this dangerous pest of pine cultures. Among such also *Evetria turionana* HB. should be ranked.

The gap in the knowledge of this pine moth biology concerns: the place and way of egg laying, information on egg morphology and embryonic development period, and finally the place and way of feeding of youngest instars of the caterpillar. The gap being evaluated by time measure — is rather serious since it covers the period — from 1st decade or a middle of May, until the end of July or the middle of August.

The biologic formula for *E. turionana* HB., given by ESCHERICH is $\frac{56 - 67,4}{45 + 56}$; and it is in line with our observations from Poland, though for its south-western provinces (Upper Silesia) its respective dates seem to be a little delayed. According to the records of Forest Research Institute

field station at Świerklaniec (U. Silesia) first pupae were collected there already on March 16, 1961. The main peak of pupation period occurs, however, in the 1st decade of April. The period of flight culmination took place during first days of May this year.

In central Poland (forest-district Chrzastów, near Częstochowa) I collected pupae in masses on April 26, 1961; that was at beginning of the flight; during the subsequent collection on April 30, 1961 ca. 30% of *E. turionana* population was already in imago stage.

In the first half of May young shoots of pine are still so poorly advanced in the development that their top buds are not visible. In this connection ESCHERICH's remark about the egg laying by *E. turionana* female in a single way on middle bud of top verticil have to raise some doubts. They occurred also to the mentioned author who tried to explain this rather puzzling, with such an assumption and in such conditions, way of egg laying: "...wahrscheinlich an die Spitze der Knospe zwischen die Schuppen".

In order to discover the actual place of egg laying on May 1, 1961 I placed 3 freshly emerged moths: 2 ♀ and 1 ♂ of *E. turionana* on a pine growing in a pot in laboratory.

The moths were set in an isolator covering the twig. The majority of eggs were laid by ones on isolator walls, three of them, however, were located on the inner side of basal part of a needle, in the vicinity of needle sheath (fig. 1). Having this cue as a guide the eggs were found just in such situations in nature.

The way of single eggs disposition can resulted from fact that egg laying process is continued for rather extended period of time.

Fig. 1. The egg of *Evetria turionana* Hb. on the needle

And in fact — one of mentioned experimental females died after 8 days, while the other one lived for 17 days. Other experiments confirmed the relatively long life duration of moths which do not take any food during this stage. Eggs of *E. turionana* contained in female ovaries are of oval shape, with dimensions ca. $1 \times 0,8$ mm, with pale yellowish colour. Very thin chitinous tunicle has fine and superficial reticulated sculpture (Fig. 2). The egg at the moment of laying is flattened against the substrate settling into the shape of oval, on one side slightly

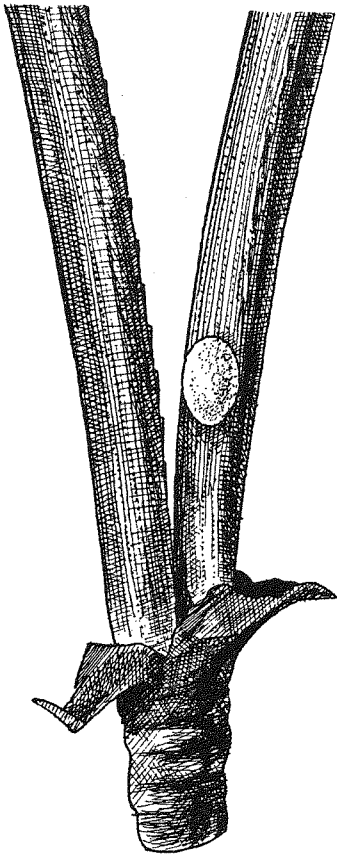




Fig. 2. Two eggs of *E. turionana* Hb. with fully developed embryos

convex lens (fig. 3). The egg's wall adhering to the substrate is well adapted to all its inequalities. Similarly, after all, also eggs of *Evectria buoliana* change their shape at the moment of laying what with this species is of the more significance, as the surface of the substrate shoot is much more variable, than the surface of inner side of a needle. Changes of egg colour, virtually colourless and transparent, are influenced by pale brownish colour of the embryo.

The beginning of larvae hatch in above mentioned isolator observations occurred on May 17—19. So the embryonic development in laboratory conditions lasted for about fortnight time (probably somewhat longer). After the hatch the larva goes on a May shoot where it builds a fine cocoon made of single threads around a pair of young needles which are just edging themselves out the sheaths. Soon on threads of yarn appear excremental pellets which are carried by the larva in mandibles from the tunnel mined in a needle. The needles mined by the larva become colourless, apparently faded. This change of colour together with threads and excrement pellets reveal the feeding ground of larvae (Fig. 4). After few days the larva pass the 1st instar. The exuvium, and rather only the head capsule, is removed from the feeding place and usually is to be found among the threads of yarn. It measures 294μ . After the indusium larva leave

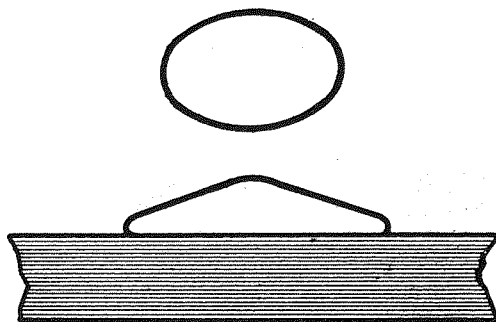


Fig. 3. The egg of *E. turionana* Hb. in female ovaries (above) and after the laying (below)

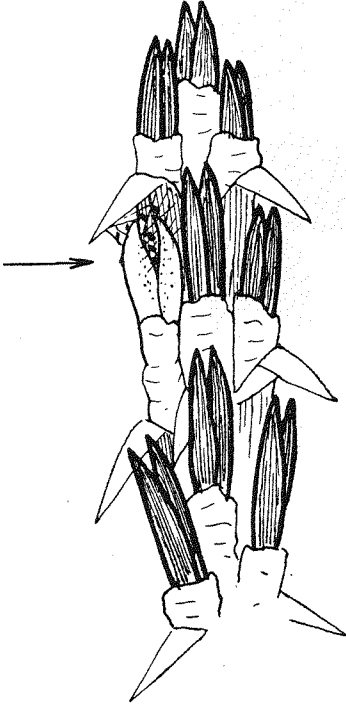


Fig. 4. The feeding place of the 1st instar of the larva of *E. turionana* Hb.

for good its first feeding ground which is already entirely exploited.

It's further fate is in the light of my recent, scanty observations rather unclear. Pale yellow-brownish larva with black-brownish head and identical scutellum either goes to another pair of needles, either starts feeding on a young shoot mining a tunnel in it. Both of mentioned cases occurred in my laboratory breedings but one have to bear in mind the fact that young shoots of pine grown in pots were developed poorly and not normally; what undoubtedly should have some effect upon the behaviour of larva. Larvae in breedings passed the 2nd instar with the end of 1st decade of June (June 8—12, 1961). At that time their length amounted some 4,5 mm.

It is during 3rd instar when *E. turionana* larvae gnaw into buds. This is nearly always the central bud, most frequently from a top verticil. The process of larvae passing into buds starts about the last decade of July, reaches its culmination about mid-August and is continued until the last decade of this month. Before commencing the feeding larva builds a loose cocoon near the base of lateral buds. Sometimes first threads of yarn are

stretched between the base of buds and sheaths of adjacent needles. The opening is gnawn in the top part of a shoot immediately to the base of needles. Informations of previous authors suggesting the gnawing of larva from the top of a bud are the consequence of wrong assumption that eggs are laid on buds and gnawing into them follows immediately after larvae hatch. The fine cocoon made of white threads (situated as it was mentioned near the base of lateral buds) gradually grows thick, becomes compact and soon starts slightly pearly opalize; afterwards it hardens, loose its glaze and becomes white.

The changes resulted from larva incrusting the yarn with resin droplets. Tiny droplets secreted in places of shoot's wounds larva takes lightly between its mandibles and fills among threads of yarn, constructing thus a kind of a roof sheltering the entrance opening to the feeding ground. Oftenly when the resin flow is stronger, some amount of it flows along the shoot making the feeding place of *E. turionana* Hb. visible from afar. To some extent this flow is a distinctive feature of *E. turionana* feeding. With *E. buoliana* it occurs not so frequently, since the larva gnaws itself not into

a shoot but into lateral bud at some distance from bud's base what results in the resin surplus flood and graduation in basal parts of the verticil of buds. On contrary to *E. buoliana* the larva of *E. turionana* gnaws itself not into the lateral bud but into central bud from the start.

Only from the comparison of buds or shoots bulk destroyed by larvae of each of mentioned species it follows that the feeding on needles of youngest larval instars have to be much more intense in *E. turionana*.

Observations cited and obtained, as it was mentioned, on the occasion of studies of other pine moths species concern only some incidents from *E. turionana* life and are based upon a scanty material. They do not fill all gaps in former information from this field. After alleven an exhaustive monographic study on *E. turionana* would consist onyl in the part of a broad problem concerning the group of insects noxious to pine young stands.

This problem, urgently needing the elaboration, should be approached in the aspect of synecological research, solely reasonable not only from biological but also from economic standpoint.

Summary

The author gives notes on oviposition, egg morphology, embryonic development, and feeding habits of the primary larval instars of the pine moth *Evetria turionana* Нв.

Zusammenfassung

Die vorliegende Arbeit bringt Angaben über Eiablage, Morphologie der Eier, Embryonalentwicklung und Nahrungsaufnahme der ersten Larvenstadien von *Evetria turionana* Нв.

Резюме

Настоящая работа содержит данные о яйцекладке, морфологии яиц, эмбриональном развитии и принятии пищи у первой стадии личинок *Evetria turionana* Нв.