

**Seasonal variation in the male genitalia of  
*Plagodis dolabraria* (LINNAEUS, 1758)**

(Lepidoptera, Geometridae)

by

NESINA MARIANNA VITALIEVNA

received 4.XI.1994

**Summary:** An interesting seasonal variation in the male genitalia of *Plagodis dolabraria* L. (Lepidoptera, Geometridae) was confirmed by a breeding experiment. The furca arms of the summer generation are almost symmetrical while in the spring generation the left arm is only about 2/3 the length of the right one. This case should be interesting from a taxonomic point of view.

It is well known that the insects' genitalia are the most conservative morphological structures. Exactly in this very capacity they are used in taxonomy. That is why any reports on the insects' genitalian modification are interesting from many points of view. An interesting seasonal variation in the male genitalia of several species of the genus *Plagodis* HÜBN. was discovered by RUPERT (1949). He had described the polymorphism in *P. purpuraria* PEARSALL, *P. phlogossaria* GUENÉE and *P. fervicaria* HERRICH-SCHÄFFER, while the similar variation in *P. alcolaria* GUENÉE was analysed by HEITZMAN & ENNS (1977). They have shown that the furca arms of the summer-form of these species are bigger than in the spring-form and asymmetrical.

As regards *Plagodis dolabraria* L., that is widely distributed in Europe, its furca was described by PIERCE (1914) as asymmetrical, left two-thirds of right. Yet SATTLER (1963), basing on collections of Japanese moths, had assumed the same type of seasonal polymorphism described from North-American species also occurs in *P. dolabraria*. As no one had examined the dimorphism's heredity, up to now this matter was not ascertained for sure. So our aim was to prove SATTLER's proposal by an experiment. The work was carried out in 1991 in the laboratory of the Forest on Vorscla reserve (Belgorod region, Russia). The ratio of the left to right furca's arms' length was calculated for all the moths caught in that year as well as for those found in the collections. The average ratio of the spring-form was 0.78 (10 ♂♂ of *P. dolabraria*, 7 of those caught in 1991, were examined). The ratio of the summer generation was 0.94 (21 specimens, 18 of those caught in 1991, were examined) (Fig. 1). We have also found three specimens that ought to belong to the summer generation but their ratios are 0.73 (3.VII.1990, leg. STEKOLNIKOV), 0.78 (5.VII.1990, leg. STEKOLNIKOV) and 0.83 (8.VII.1990, leg. KRIVUCHATSKY).

The offspring of females was reared under different conditions. Some caterpillars developed in long-day like those of the summer generation (18 hours of light, 24°C), others were reared under short-day conditions (10 or 14 hours of light, 24°C). The pupae of the latter hibernated and the moths appeared in spring. The average ratio of such a hibernated males was 0.72 (10 specimens), for the summer generation the ratio was 0.9 (also 10 ♂♂). It is necessary to say that among both samples specimens were detected, which ratio would be more typical

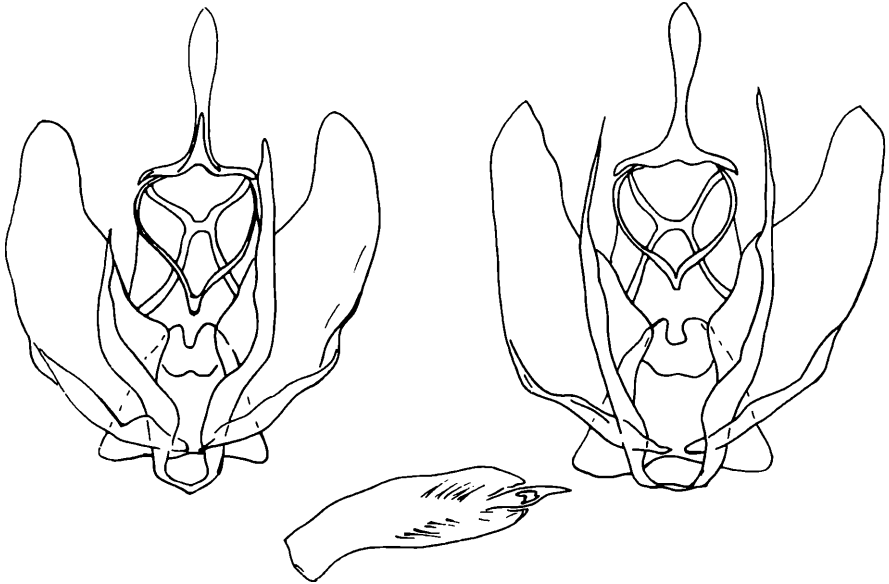


Fig. 1: Male genitalia of *Plagodis dolabraria* L., asymmetrical spring-form (at the left), symmetrical sommer-form (right) and an aedeagus.

for the other seasonal form. Thus three not-hibernated males showed ratios of 0.8, 0.81 and 0.83, and three males from spring generation calculated for 0.86, 0.87 and 0.90. Therefore we can state that all the moths that are known as *Plagodis dolabraria* L. really belong to this single species, the two broods of which differ by the symmetry of the male's genitalia. This polymorphism is determined by the day-length conditions of the caterpillars' life. Contrasting *P. dolabraria*, the North-American species of the spring brood show more symmetrical furca arms than the summer brood. But it is interesting to know that we also have observed that opposite type of asymmetry in three moths of the summer generation of *P. dolabraria* (one resulting from the breeding experiment): their ratios were 1.027, 1.22 and 1.06 (the latter was the reared one).

## References

- HEITZMAN, R. L. & W. R. ENNS (1977): An analysis of the variation in male genitalia between broods of *Plagodis alcolaria* Gn. (Lepidoptera: Geometridae). – J. Kans. Entomol. Soc. 50 (2): 256–258.
- PIERCE, F. N. (1914): The Genitalia of The Group Geometridae of the Lepidoptera of the British Islands.

- RUPERT, L. R. (1949): A revision of the North American species of the genus *Plagodis* (Lepidoptera, Geometridae, Ennominae). – J. New York Entomol. Soc. **57** (1–4): 19–50.
- SATTLER, K. (1963): Zur Kenntnis der Gattung *Plagodis* HÜBNER, 1823 (Lepidoptera: Geometridae). – Z. Wien. ent. Ges. **48**: 25–32.

address of the author

NESINA MARIANNA VITALIEVNA  
Komissara Smirnova street 8, 60  
194175 St. Petersburg  
Russia