

The critical day-length in these populations (Fig. 31) varies from 14 hours 30 minutes in the Adzharian to 18 hours 30 minutes in the Leningrad race, i.e. within approximately the same limits as with *Acronycta rumicis*. In the Leningrad form incomplete photoperiodic reaction and partial (about 30%) diapause were also observed, even in continuous light. In other words, in this

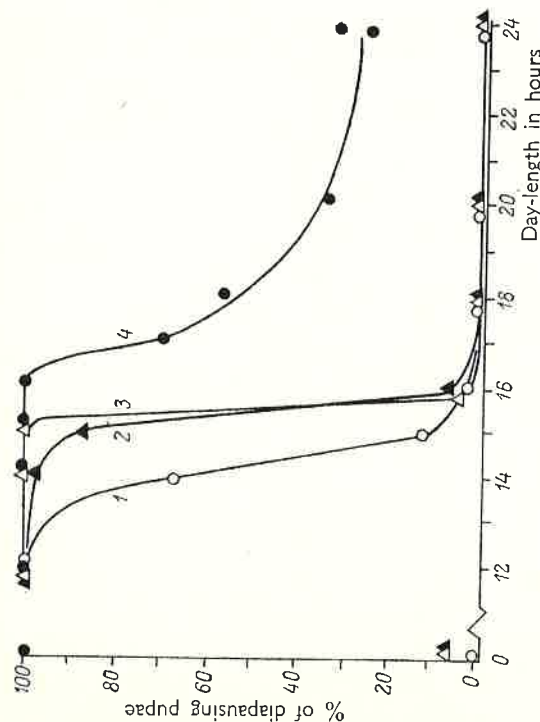


FIG. 31. The geographical variation in the photoperiodic reaction in *Barathra brassicae*. Temperature 25°.

Populations: 1, Adzharian (41°-42°N.); 2, Sumy (50°N.); 3, Belgorod (50°N.); 4, Leningrad (60°N.).

race a hereditary monocyctic type of development has already been established to a considerable extent. It is significant that both forms of the forest-steppe race not only are characterized by an intermediate value of threshold day-length, about 15 hours 30 minutes, but prove to be practically identical in their reaction. This again demonstrates that the investigated changes in photoperiodic reaction depend mainly on latitude and not on other features of the habitat.

Another example of variation in photoperiodic reaction depending on the latitude in which species live is provided by the spider mites Tetranychidae, investigated by BONDARENKO and KUAN KHAI-YUAN' (1958) and also by GEISPTS (1960). These

data are particularly interesting because they relate to members of an entirely distinct systematic group of arthropods, and therefore give evidence of the general application of the rule.

According to the investigations of Bondarenko and Kuan Khai-yuan' (1958), the critical day-length for the Leningrad population of *Tetranychus urticae* at a temperature of 20° is slightly over 17 hours (Table 24). With a longer day all females develop continuously. In the southern form the critical threshold is much lower, as a result of which diapause occurs only when the day-length is less than 13 hours, and thus in this species one may see how the threshold depends on latitude. These data are confirmed by GEISPTS (1960) in studies of various natural populations of *Tetranychus urticae*.

TABLE 24

The photoperiodic reaction (percentage of diapausing females) of geographical populations of the mite *Tetranychus urticae*. Temperature 20°

(after Bondarenko and Kuan Khai-yuan', 1958)

Population	Day-length in hours											
	0	9	10	11	12	13	14	15	16	17	24	
Leningrad (60° N.)	40.2	—	—	—	—	—	100	100	100	95.3	0	
Krasnodar (45° N.)	2.8	—	—	100	84.7	2.2	0	—	—	—	0	
Tiflis (42° N.)	1.0	—	90.1	85.4	21.5	0	0	0	—	—	0	
Tashkent (41° N.)	1.9	91.3	85.1	82.6	44.6	0	—	—	—	—	0	

Equally clearly shown are geographical variations in photoperiodic reaction in the mite *Metatetranychus ulmi*. Comparison of the results obtained by Geispts for the Leningrad (60°N.) and Northern China (40°N.) races of this species with data from the experiments of Lees (1953a) for the south of England (52°N.) show a consistent and well-marked decrease in the critical threshold for southern races as compared with northern (Table 25).

Thus in different polycyclic species with facultative diapause one observes a uniform type of adaptations to zonal-geographical