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Independent response of 2 characters to selection for insensitivity to photoperiod in *Pyrrhocoris apterus*

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Summary. The obligatorily macropterous strain of *Pyrrhocoris apterus* has been selected for 29 generations. Nevertheless, the strain retained a photoperiodically controlled diapause.

In *Pyrrhocoris apterus* L. (Heteroptera, Pyrrhocoridae), 2 characters are controlled by photoperiod: the diapause and the wing polymorphism[2-4]. Under constant short-day conditions, this species diapause and virtually all individuals become brachypters with reduced membrane of the fore-wing. Under constant long-day, the insects do not diapause and a fraction of population becomes macropterous with fully developed membranes of the fore-wing. In our cultures we selected *Pyrrhocoris* for macropterousness for 29 generations. The insects were bred by standard methods: held in groups in plastic vials and supplied with linden seed and water. The photoperiod used was either light 18: dark 6 (long day) or light 12: dark 12 (short day) and temperature 26 ± 1 °C.

In the 1st-22th generation, the selection was applied in long-day conditions by taking groups of 25-50 macropterous individuals of the previous generation as parents for the next generation. By these means the proportion of macropters in the population increased to about 70% within 9 generations and remained approximately constant, with smaller variations caused presumably by minor variations in laboratory conditions. In short-day conditions, the percentage of macropters remained fairly low till 23rd generation, when a small fraction of macropters appeared. Then the new method of selection was adopted: the macropters from short-day were activated by transfer to long-day conditions and used to establish further generation. By this procedure, the percentage of macropters increased within a few generations, both in long-day (to more than 90%) and short-day (to about 70%) conditions. Thus a large fraction of this selected population can be considered as photoperiodically insensitive with respect to wing polymorphism (figure 1).

The diapause properties were tested in this selected material in 26th and 28th generations. In contrast to the lack of morphoregulative effect of photoperiod, the selected macropterous strain, like the wild material, retained full capacity for diapause induction. Under constant short-day, both brachypters and macropters did not exhibit any sign of reproductive activity for at least

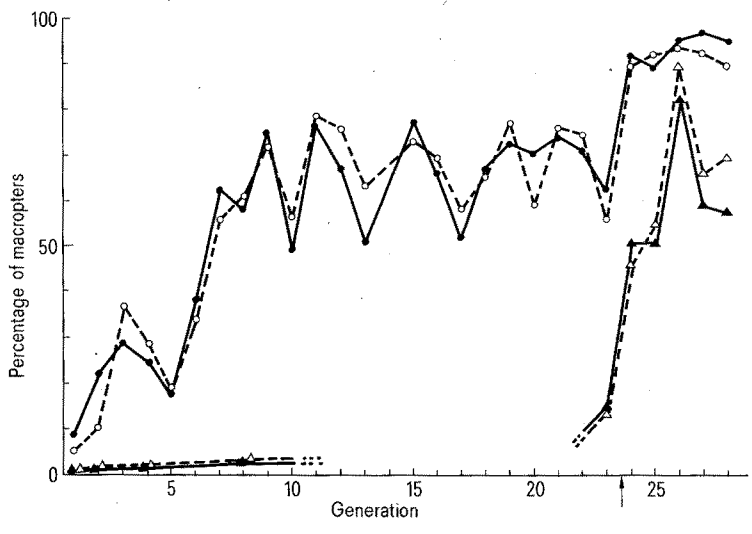

Fig. 1. The percentage of long-winged individuals in the strain selected for macropterism during 29 generations. ●——● long-day, males; ○----○ long-day, females; ▲——▲ short-day, males; △----△ short-day, females; ↑ new method of selection adopted (see explanation in text).

50–90 days from imaginal ecdysis. Thereafter sporadic active females appeared. After the transfer of young diapausing females to long-day conditions, the median preoviposition lasted 21 days in selected strain, while that of nonselected strain lasted 22–24 days. No substantial difference in diapause intensity between different geographic populations was observed[5]. The slight decrease of diapause intensity in the selected strain is not very important since the median preoviposition (from imaginal ecdysis) of nondiapause individuals of both strains in long day conditions is only about 8–10 days (figure 2).

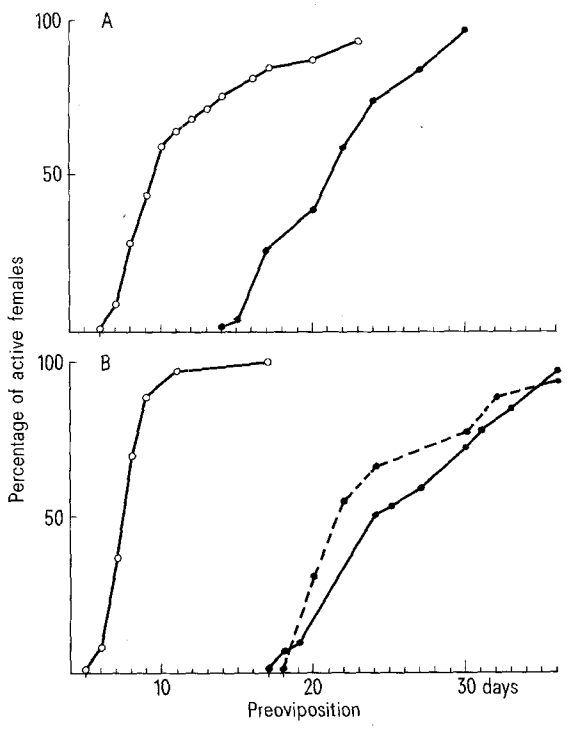

Fig. 2. Duration of preoviposition (from transfer to long day in diapausing and from imaginal ecdysis in nondiapausing females resp.). *A* Selected macropterous strain (28th generation; ●——● diapausing females (N = 31), ○——○ nondiapausing females (N = 32). *B* Nonselected material (2nd generation); ●——● diapausing females from Bohemia (N = 31), ●----● diapausing females from Central Asia, Alma-Ata (N = 18), ○——○ nondiapausing females from Bohemia (N = 36).

The possibility of changing the photoperiodic reaction by selection was demonstrated, with respect to diapause, several times[6–10]. Also the systems responsible for polymorphism in flight organs and/or flight performance are capable of selection[11,12]. In our experiments, probably for the first time, the originally homogeneous photoperiodic reaction of 2 characters has been separated by selection. Theoretically, selection may operate at several levels: the level of sensory receptors, the level of CNS elaboration of environmental cues[13], the level of humoral mediators[14,15] or the level of sensitivity of target organs. In the macropterous strain of *P. apterus,* evidently the capacity to perceive the photoperiodic signal and to elaborate it into the endocrine impulses for ovariole ripening was not disturbed. Thus, either the hormonal mechanism controlling wing polymorphism and that controlling diapause must be different, or the selection must operate at some lower level, presumably that of the sensitivity of target organs (i.e. groups of cells destined to develop into wing membranes).

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Binding of cytophilic rabbit IgG to homologous hepatocytes

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Summary. Rabbit liver cells were able to bind cytophilic monomeric and polymeric homologous IgG via their Fc receptor binding sites (FcR). On the other hand, non-cytophilic rabbit IgG did not bind to hepatocytes, even after its aggregation. The present findings suggest that FcR on rabbit liver cells are specific for cytophilic monomeric IgG but do not significantly bind non-cytophilic, polymeric IgG.

It has recently been reported that human and rabbit hepatocytes are able to attach allogenic and xenogenic IgG via their FcR. The results have shown that heat-aggregated IgG or antigen-IgG antibody complexes are attached to more than 90% of the hepatocytes, while monomeric IgG (7 S) is bound to less than 10% of the treated cells[2]. The attachment was revealed by immunofluorescence using a sandwich technique with non-labelled IgG and fluorescent anti-IgG antibody. However the fluorescent staining data were contradicted by the lack of rosette formation between hepatocytes and sheep red blood cells (SRBC) coated with IgG anti-SRBC (EA)[2]. These controversial results might be explained by the assumption that the hepatocytes have only FcR for monomeric IgG (the so-called cytophilic IgG[3]). Thus the binding of heat aggregated IgG or soluble antigen-antibody complexes is exclusively accomplished by the