between 24 and 48 hr. after isolation of the leaf. Intravacuolar strand formation is followed by the movement of the nucleus and the chloroplasts from a peripheral to a more central position in the cell. Hence the cytoplasmic strands facilitate a clustering of cytoplasm and chloroplasts around the nucleus, resulting in a typical systrophe or cluster formation (Fig. 2). Ultimately one cytoplasmic strand becomes the most prominent one, and cell wall formation is initiated along this strand. This strand represents, therefore, the phragmosome[2]. The remaining strands disappear gradually.

Strand formation leading to systrophe is, therefore, an important event in cellular dedifferentiation and results here simply from isolation. These results are in agreement with Heitz's[3] important observations on regeneration and his suggestion that wounding cannot be the important factor in the initiation of events leading to cellular regeneration. Sinnott and Bloch[2] have described cell division in vacuolate plant cells in normal plant development. Their illustrations show strand formation resulting in a more central position of the nucleus and cytoplasmic cluster formation around the nucleus. Thus in normal plant development enlarging yet still actively dividing cells undergo dedifferentiation accompanied by cytoplasmic cluster formation before each division. Hence changes in intracellular configuration which occur during dedifferentiation and which in the present instance are the result of isolation appear also to be a characteristic of normal plant development.

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KRAFT E. VON MALTZAHN
MARY M. MACNUTT

Botanical Laboratories,
Dalhousie University,
Halifax, N.S.

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ENTOMOLOGY

Prevention and Artificial Induction of the Imaginal Diapause in *Coccinella 7-punctata* L.

BY field observations, dissections and analyses of field samples it was discovered that the female diapause in *Coccinella 7-punctata* L. (Col. : Coccinellidae) is connected with a gonotrophic dissociation, which is not the case in male individuals. After the induction of diapause the adults of both sexes accumulate reserves (fats and glycogen) ; afterwards they stop feeding and migrate towards the winter quarters. During this prehibernation accumulative feeding-period, the females remain sexually immature. On the other hand, for males the maturation of gonads is not such a strain on energy reserves ; both diapausing and active males rapidly reach maturity and only stop tissue activity in testicular follicles immediately before hibernation. At this period they have already accumulated sperm reserves in the seminal vesicles and encysted sperms in the testicular follicles. Already before hibernation they fertilize a part of the females, hibernating afterwards with sperm reserves in the spermatheca. In the spring the males renew their sexual activity long before the females. They fertilize females in the hibernating quarters. The ovaria mature later—only after feeding on the essential aphid food. During hibernation the fat reserves in both sexes are reduced to a half ; the glycogen in males to one-fifth, in females to one-third.

A mixed population, consisting of monovoltine insects with the obligate diapause and of polyvoltine insects with the facultative diapause, obviously lives in Central Europe.

In order to reveal the mode of action of factors inducing the diapause we tried to prevent this phenomenon experimentally and, on the other hand, to induce it artificially.

By breeding the Coccinellidae under optimal conditions of a continual excess of food (aphid *Pergandeida medicaginis* Koch), long photoperiod (16–18 hr.) and a higher slightly alternating temperature (mean 25° C. ; 22–28° C.) we succeeded in gradually preventing the diapause[1]. It is obvious that a gradual selective elimination of the monovoltine insects resulted. It is then possible to breed the ladybirds continuously. When any departure from the optimal culture conditions has arisen (especially from excess of food in cages with many individuals) a certain amount of diapausing ladybirds also developed in the next generations. This situation is very similar to that in *Leptinotarsa 10-lineata* Say. The possibility of interpreting this feature in the same way in both these insects arises from the results by De Wilde and Stegwee[2] : they found a marked decrease of the number of diapausing females in the cultures of single pairs of *L. 10-lineata*.

Experiments with polyvoltine Coccinellidae from artificial cultures showed that there is a correlation between the photoperiod and temperature in the induction of imaginal diapause, the photoperiod being the more significant factor[3]. The long photoperiod (16 or 19 hr.) appears to prevent the diapause even at a relatively low temperature (18° C.). The short photoperiod (8 or 12 hr.) induces the diapause. In a short photoperiod the induction of diapause is stimulated in addition by a low temperature ; but inhibited by a high one.

The character of the artificially induced diapause was studied by comparative dissection and analysis. Dissection did not reveal any differences in the fat body and ovaria. Analysis showed that females with artificially induced diapause had the same glycogen reserve, and that the fat reserve was only one-fifth lower than in the naturally diapausing females. On the other hand, in experimental active females the fats were less than a half and glycogen just half the amount in the experimental diapausing females. On the basis of these results, the artificially induced diapause can be considered equivalent to the natural diapause.

I. HODEK
Entomological Institute,
Czechoslovak Academy of Sciences,
Prague.

J. CERKASOV
Biological Faculty,
Charles University,
Prague.

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