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Apicultural Problems

Rothamsted Research

Rothamsted Research (1939) *Apicultural Problems* ; Rothamsted Report For 1938, pp 88 - 89 - **DOI:** <https://doi.org/10.23637/ERADOC-1-86>

- LVIII. F. M. L. SHEFFIELD. "Vein Clearing and Vein Banding Induced by *Hyoscyamus III* Disease." *Annals of Applied Biology*, 1938, Vol. XXV, pp. 781-789.

The first symptom of Hy. III disease in tobacco is a clearing of the veins. This is followed later by vein banding. During clearing no anatomical or cytological abnormalities occur. The yellow colour is due to a retardation of chlorophyll formation.

When vein banding becomes apparent considerable hypertrophy is seen in the tissues near the veins and hypoplasia is apparent in the interveinal areas. Intracellular inclusions are abundant in all tissues except the xylem.

Cleared tissue contains 6-11 times as much virus per unit volume as does the banded tissue. The latter also contains less than do the yellower parts of banded leaves.

- LIX. M. A. WATSON. "Further Studies on the Relationship Between *Hyoscyamus Virus 3* and the *Aphis Myzus persicae*, with Special Reference to the Effects of Fasting." *Proceedings of the Royal Society of London, B*, 1938, Vol. CXXV, pp. 144-170.

The efficiency of *Myzus persicae* in transmitting Hy. 3 virus increases with increasing time of fasting before feeding on the infected plants. Their efficiency decreases with increasing feeding time on the infected plants up to one hour, at which time a constant low level is reached. Infectivity is lost by the aphides when fasting after infection feeding, but the loss is less rapid if the feeding time on the infected plants was very short. The rate of loss of infectivity appears to be more rapid than the rate at which the virus is inactivated *in vitro* in expressed plant sap. Individual aphides vary in their efficiency as vectors, but the relative efficiency of individuals can be altered if the preliminary fasting treatments are varied. The most probable explanation of these results is that the virus is inactivated by some substance secreted by the aphides when feeding.

- LX. F. M. L. SHEFFIELD. "Microsurgical Studies on Virus-Infected Plants." *Proceedings of the Royal Society of London, B*, 1939, Vol. CXXVI, pp. 529-538.

Cells of virus-infected plants were examined by micro-manipulative methods.

The pH of the cell contents was found to be the same in diseased and in healthy plants.

The non-crystalline intracellular inclusions of aucuba mosaic disease of tomato disintegrate immediately on slight mechanical pressure or on pricking. They are almost unaffected by acids from pH 7 to 2.2. They break down if the osmotic pressure is reduced below 0.07 M, but can be isolated into solutions of 0.1 M. These inclusions contain virus, but virus may also be dispersed through the cell.

The striate material of tobacco and enation mosaics cannot be isolated, as immediately it is touched with a micro-needle it breaks down into needle-like fibres.

APICULTURAL PROBLEMS (Section for Bee Investigations)

- LXI. H. L. A. TARR. "Studies on American Foul Brood of Bees." II. *The Germination of the Endospores of Bacillus larvae in Media containing Embryonic Tissues*," with an Appendix by W. G. COCHRAN. *Annals of Applied Biology*, 1938, Vol. XXV, pp. 633-643.

The difficulty of producing vegetative growth from the spores of *Bacillus larvae*, the organism responsible for American foul brood of bees, even on rich media such as a complex egg yolk carrot extract suggested the possibility of using media containing the tissues of the developing chick embryo. Experiments comparing four different media showed that chick embryo "brei" and the chorioallantoic membrane of the developing chick are by far the most favourable media yet found for the growth of this organism. Added available nitrogen in the form of beef digest broth to the embryo brei tended to inhibit

germination. Concentrations of reducing sugars up to 12.5 per cent. caused no apparent reduction in the germination of *B. larvae* spores on the chick embryo media. This is of interest because of previous suggestions that the reducing sugar content of bee larvae at various stages in their development might be connected with the age-incidence of American foul brood.

- LXII. H. L. A. TARR. "Studies on American Foul Brood of Bees. III. The Resistance of Individual Larvae to Inoculation with the Endospores of *Bacillus larvae*." *Annals of Applied Biology*, 1938, Vol. XXV, pp. 807-814.

Experiments are described in which attempts were made to produce American foul brood by the direct inoculation of eggs, or of larvae from the time of hatching up to that just subsequent to sealing, by placing aqueous suspensions of the washed spores of *Bacillus larvae* in the cells. In no case did the disease develop in the colony into which the inoculated larvae were introduced. Positive results were, however, obtained by spraying a comb containing eggs and young larvae with an aqueous suspension of the spores of *B. larvae*, the disease becoming evident seven days after spraying. Since in this case the adult bees had access to the spore suspension it can be inferred that the adult bee plays an important part in the inoculation of the brood. Experiments designed to test the possibility that *B. larvae* undergoes some change during its carriage by the adult bee yielded negative results.

- LXIII. H. L. A. TARR. "Studies on European Foul Brood of Bees. IV. On the Attempted Cultivation of *Bacillus pluton*, the Susceptibility of Individual Larvae to Inoculation with this Organism and its Localisation within its Host." *Annals of Applied Biology*, 1938, Vol. XXV, pp. 815-821.

Attempts to grow *Bacillus pluton*, the causal organism of European foul brood in bees, on the minced tissues of the chick embryo, or on its chorio-allantoic membrane were unsuccessful, in contrast to *B. larvae*, which grows well on these media. Small doses of *B. pluton* which were unable to produce growth on chick embryo medium or on beef digest brood filtrate medium were instrumental in causing European foul brood in young bee larvae when placed in the cells along with the normal brood food. Stained sections cut from larvae of all ages and showing all stages of the disease showed that *B. pluton* is localised in the food mass within the peritrophic membrane. The disease is shown to be a purely intestinal infection of the bee larva. The organism responsible is a strict parasite.

TECHNICAL AND OTHER PAPERS

GENERAL

- LXIV. E. J. RUSSELL. "Science and the Indian Peasant." *Journal of the Royal Society of Arts*, 1939, Vol. LXXXVII, pp. 662-674.
- LXV. E. J. RUSSELL. "National Planning in Agriculture: its Possibilities and its Limits." *Nineteenth Century and After*, 1938, Vol. CXXIV, pp. 187-199.
- LXVI. E. J. RUSSELL. "Poland To-day." *Journal of the Royal Society of Arts*, 1938, Vol. LXXXVII, pp. 125-128.
- LXVII. B. A. KEEN. "What Happens to Rain." *The Listener*, 1939, Vol. XXI, pp. 319-320.
- LXVIII. J. MEIKLEJOHN. "The Starling—Friend or Enemy?" *Journal of the Royal Agricultural Society of England*, 1938, Vol. XCIX, pp. 37-53.

This paper contains a review of the present knowledge of the status and habits of the starling, especially those which are of agricultural importance. It also contains an estimate of the density of the starling population in several parts of England, taken from comparative counts of nests, and an account of an experiment on the recovery of plants bitten off by birds.