

from the colony in Inwood Copse. From this culture teleutospore material was obtained, under controlled conditions, during the summer of 1948, and this was tested on various strains of *O. pyrenaicum*, as well as on other species of *Ornithogalum* in our own collection. Teleutospore material was also collected from other sources, for parallel tests on the same hosts, and particularly on different collections of *O. pyrenaicum*.

Inoculation experiments were carried out from December 1948 until May this year. It was found that three strains of *O. pyrenaicum* L., one from Dr. Dennis, a Dutch one, and another from Coimbra (Portugal), were readily infected by the sporidia of the teleutospore material obtained from Prof. Brooks's culture, as well as from the other sources used. On the other hand, it was found that a Portuguese strain of the same species of *Ornithogalum* (from Minho) was immune to all the cultures. Similar results were obtained with other species. Thus, all the strains tested but one from each of the species, *O. narbonense* L. and *O. umbellatum* L., were congenial to *P. hordei*; the immune strain of the first species was collected at Parede (Portugal), and the immune strain of the second species was obtained from Valencia (Spain). Also a number of seedlings of *O. nutans* L., inoculated in the same way, showed all the degrees of susceptibility to the gametophytic stage of the rust, from perfect congeniality to a very sharp necrotic hypersensitive reaction.

Experiments carried out with collections of other species of *Ornithogalum* gave the following results: *O. Boucheanum* (Kth.) Asch., *O. comosum* L., *O. concinnum* (Salis.) Rich., *O. Kotschyianum* Fenzl., *O. libanoticum* Boiss., *O. montanum* Tenore, *O. nanum* L., *O. neglectum* Perl., *O. oligophyllum* Clarke, *O. Pater-familias* Godr., *O. scilloides* Jacq., *O. Skorpilii* Vel., and *O. unifolium* Kern, all proved to be congenial to *Puccinia hordei* Oth. *O. arabicum* L. developed only the primordia of spermogonia, showing afterwards a necrotic reaction on the infected areas of the leaves, but was susceptible on the flowers, where large aecidial sori were formed. *O. caudatum* Aiton, *O. graminifolium* Thunb., and *O. longibracteatum* Jacq. were not infected at all on the leaves and stems, but infections with the production of aecidia were obtained on flowers.

During these experiments, inoculations were also made on other Liliaceae, and *Dipcadi serotinum* (L.) Medic. proved to be congenial to the rust, leading to the production of abundant aecidia. The connexion of the aecidia experimentally obtained with teleutospores of *Puccinia hordei* (*P. anomala*) was, in every case, confirmed by back inoculations to Spratt Archer barley.

Since so many hosts proved to be congenial to this heteroecious rust, and since the influence of this stage on the survival of *P. hordei* from year to year is still controversial, as well as the importance of the gametophytic stage on the breeding of new physiological races, it seems that a detailed survey must be carried out throughout the world, wherever susceptible species of *Hordeum* are grown; but chiefly in very dry countries where there is no possibility of the survival of the rust on odd plants or on any confined culture of barley in the mountains.

I intend to follow up my studies on the aecidial stage of this rust, and shall be grateful to botanists who will kindly supply me with seeds, or preferably bulbs, of species of *Ornithogalum* or any related genus. I shall also appreciate teleutospore material of *P.*

hordei from cultivated barleys as well as from wild species of *Hordeum*.

BRANQUINHO D'OLIVEIRA

Estação Agronómica Nacional,
Sacavem, Portugal.

June 20.

¹ Dennis, R. W. G., *Nature*, **162**, 461 (1948).

² Naumov, N. A., "The Rusts of Cereals in the U.S.S.R.", 297 (1939).

³ d'Oliveira, B., *Rev. Agron.*, **28**, 205 (1940).

Potato Tubers Freed from Leaf-roll Virus by Heat

THE inactivation of viruses in living plant tissues by heat has been successfully applied to free sugar cane from sereh disease¹, peach from four diseases² and periwinkle from aster yellows³. Attempts to cure virus-infected tubers by heat, however, have hitherto been unsuccessful⁴.

Since 1944, experiments on the conditions in which potato tubers survive storage at high temperatures showed that they can remain viable after considerable periods at 37–40° C., provided the atmosphere is kept sufficiently moist. Preliminary tests also indicated that tubers could be freed from leaf-roll virus by storage under such conditions. This has been confirmed in 1949 by more extensive tests with tubers of the varieties Majestic and Arran Consul infected with both leaf-roll virus and potato virus X. The tubers were placed in an incubator kept at 37.5° C. and containing a flat open dish full of water; after various periods, tubers were removed from the incubator and stored under normal conditions until they sprouted, when they were planted in pots under glass. All the unheated tubers produced typical leaf-roll plants; of those heated for periods of between ten and twenty days, some showed typical symptoms whereas others did not, and none of the tubers that survived twenty-five or more days heating produced leaf-roll plants. All the plants, however, still contained potato virus X.

B. KASSANIS

Rothamsted Experimental Station,
Harpenden, Herts.

July 1.

¹ Wilbrink, G., *Arch. Suikerind. Nederlandsch-Indie*, **31**, 1 (1923).

² Kunkel, L. O., *Phytopath.*, **25**, 809 (1936).

³ Kunkel, L. O., *Amer. J. Bot.*, **28**, 761 (1941).

⁴ Blodgett, F. M., *Phytopath.*, **13**, 465 (1923).

A Hemichordate from West Wales

IN recent years Hemichordates have been discovered in abundance only twice in British waters, although the Tornaria larva is not uncommon. Brambell and Cole¹ described *Saccoglossus cambrensis* sp. nov., which was discovered in abundance in clean sand at two localities some twenty miles apart, near Bangor. More recently, Brambell and Goodhart² described *S. horsti* sp. nov., which was found in abundance in glutinous mud in the Solent. Other records of hemichordates in British waters are summarized by Brambell and Cole, where references to literature may also be found.

In April 1949, while conducting a vacation course in marine biology at Dale Fort, Pembrokeshire (Field Study Centre of the Council for the Promotion of Field Studies), we found *Saccoglossus* in abundance in a small area of sand at low-water mark of equino-