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Berichte gelehrter Gesellschaften.

The Royal Society, London, 8/12. 1898.

Dawson, Maria. Communicated by Professor H. Marschall Ward.

„Nitragin and the nodules of *Leguminous* plants.

(Abstract.)

A study of the nodules found upon the roots of leguminous plants has led the author to an unhesitating confirmation of the parasitic nature of both the filaments and the bacteroids contained in these organs. The filaments, it was found, have no such constant relation to the nucleus of the cells, as was represented by Beijerinck in 1888. By plasmolysis of the root-hairs, the infection tube is shown to have grown into the hair, and not to correspond with the primordial utricle of the hair a result which proves that Frank was mistaken in regarding the tube as formed from the contents of the hair mingled with fungal protoplasm. By staining with aniline blue and orseillin these tubes and the filaments in the cells were shown to consist of strands of straight rodlets, lying parallel to the longer axis of the filament, and embedded in a colourles matrix. This matrix does not consist of cellulose, chitin, or any form of slime. The swellings upon the filaments occur at places where the rodlets have become heaped up, and at such places the filaments eventually burst, liberating the rodlets, whilst they themselves remain as pointed portions, directed towards each other in the cells. After liberation from the filaments, the rodlets become transformed into X, V, and Y-shaped bacteroids. This variety of shape does not occur when these organisms are cultivated ousside the plant on a solid medium, but in liquid pea extract, the change from straight rodlets to „bacteroids" occurs in a few days. By cultivating these organisms in drop cultures under constant observation with high powers, these rodlets are seen to multiply by division into equal, or sometimes slightly unequal, halves. By this method the author hopes also to determine whether the change in shape arises from fusion of two or more individuals or by branching. Their multiplication by division leads to the conclusion that these organisms are members of the *Schizomycetes*; whether or not they are true Bacteria must, however, still be undecided, until the final stage in their life history has been fully followed.

The X, V, or Y-shaped bacteroid, when once formed appears to be incapable of further growth. These organisms are aërobic in character, their power of fixing atmospheric nitrogen is to be tested in connection with their growth on silicic acid gelatine. Commercial „Nitragin" consists of minute micrococcus-like bodies, all straight and immobile. They multiply rapidly on gelatine

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media, and in pea extract become converted into „bacteroids" as well as straight rods Nitragin does consist of the tubercle organism, and as a result of the inoculation of either seeds or soil with it, tubercle formation takes place. Crossing of kinds supplied for different genera and species is quite successful within the tribe *Vicieae*. In order to test the possibility and conditions of direct infection of the roots, seedling peas, starting both before and after germination, were grown in sterile tubes, by which means the whole plant was kept under control. This method showed that direct infection of quite young radicles is tolerably certain, also of older roots, provided the conditions under which germination occurred are maintained after infection.

In order to secure infection it is not necessary that the organisms should pass through the soil, and the age of the root-hair at the time of infection seems to be without effect upon the result. An accumulation of CO_2 round the roots is not the cause of failure in direct infection.

The addition of nitragin to soils rich in nitrates appears to be inadvisable, but a supply of it to soil poor in nitrates results in an increased yield, though better results are obtained if instead of nitragin, nitrates be added to the soil.

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Original-Berichte aus botanischen Gärten und Instituten.

Der Botanische Garten der Kaiserlichen Universität zu Jurjew (Dorpat).

Von

Professor **N. J. Kusnezow.**

VI. Acclimatisations-Versuche.

In einer von meinen früheren Abhandlungen*) habe ich auf die wichtige Bedeutung des Jurjewschen Botanischen Gartens

*) Vergl. Bot. Centralbl. 1897. Nr. 12, II. Staudenquartiere und im Freien cultivirte Gehölze, p. 378—380.

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Digitale Literatur/Digital Literature

Zeitschrift/Journal: Botanisches Centralblatt

Jahr/Year: 1899

Band/Volume: 77

Autor(en)/Author(s): Anonymous

Artikel/Article: Berichte gelehrter Gesellschaften. The Royal Society, London, 8/12. 1898. 156-157