Clathrosorus, a New Genus of Plasmodiophoraceae.

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With Plate XXI.

THE material of the species here described was sent to us from Sorø, Sealand (Denmark), by Mr. H. Gram, consulting horticulturist, in the month of June, 1918. On roguing bluebells (*Campanula rapunculoides*) from his garden Mr. Gram observed that the roots of the named weed often showed numerous small swellings, calling in mind to a certain degree the bacterial tumours on the roots of leguminous plants (see Pl. XXI, Fig. 1). Some root-swellings sent to us for closer investigation were fixed in Carnoy, and as it proved that we had before us a new and interesting Plasmodiophoracea we made some slides of the material for a more detailed examination. Preparations stained with cyanine-gold-orange showed in their cytological features a pretty close accordance with the other Plasmodiophoraceae.¹ We have observed the nuclear divisions in the vegetative stage, whereof Figs. 2 and 3 on Pl. XXI give a pair of pictures, as well as in the akaryotic and sporogonic phase; in the last-named stage we saw both the heterotypic and the homoitotypic division.

The infection falls only on the cortex, whose more peripheric cells nearly all contain a single plurinucleate myxoplasma or a sporosorus; in the direction of the central cylinder the number of uninfested cells increases. Into the strongly distorted central cylinder itself the parasite never comes. The myxoplasma very often is lodging around the nucleus. The cells are scarcely hypertrophied by the invasion, but are stimulated to more frequent divisions; as a rule the myxoplasma, respectively the sporosorus, will not by far fill out the lumen of the invaded cell. It is further characteristic of

¹ See, e.g., Maire et Tisson: La cytologie des Plasmodiophoracées et la classe des Phytomyxinae; Ann. Myc., 1909. Blomfield and Schwartz: Observations on the Tumours on *Veronica Chamaedrys* caused by *Sorosphaera veronicae*; Ann. Bot., 1910. Winge, Ö.: Cytological Studies in the Plasmodiophoraceae; Arkiv för Botanik, 1912.

the parasite that the ripe sorus has the shape of an irregular, rounded or elongated ball with an uneven surface and traversed by larger and smaller cavities. The individual spores are not so solidly connected as, e. g., in *Sorosphaera* and *Sorodiscus*, where the spores are conglomerated with a common substance. In contrast to the case in all hitherto known genera of Plasmodiophoraceae the spores have at the full maturity, but first then, a finely punctuate warty membrane.

We have stated that the spores treated with Carnoy are somewhat collapsing, thus becoming flattened or depressed, and as if provided with a collar, while the spores preserved in diluted alcohol do not show this feature. Most of the other Plasmodiophoraceae seem to behave in the same manner.

Below we give a diagnosis of the new organism.

CLATHROSORUS, gen. nov.

Spec. typ.: *Clathrosorus campanulae*, sp. n.

Plasmodiophoracea radicolica, tumefaciens, cellulas corticis solum infestans. Amplificatio cellularum vix ulla. Sporosori in singulis cellulis sporosoro non impletis singuli, rotundati vel oblongi, saepe irregulares, clathrato-canaliculati. Sporae strato communi non conglomeratae, maturae globosae vel subglobosae, flavidulae, episporio subtiliter punctato-verruculoso.

CLATHROSORUS CAMPANULAE, sp. nov.

Statu vegetativo myxamoebae paulatim plurinucleatae in singulis cellulis corticis aggressu vix auctis singulae inventae, nucleum cellulae hospitalis saepe amplectentes.

Statu fructifero sporosori in singulis cellulis sporosoro non impletis singuli, transverse secti clathrato-canaliculati, desuper visi rotundati vel oblongi, foveolati et hinc circuitu irregulari, circ. $25-50\mu$ lati. Sporae globosae nec non late ellipsoideae, siccitate fluidisve fixativis validis collabescentes, sub vitro gregatim flavidae, singulatim hyalino-flavidulae, episporio subtiliter punctato-verruculoso, $4-5\frac{1}{2}\mu$ diametro.

Ad radices *Campanulae rapunculoidis* quae aggressu parasitae eodem fere modo ac radices Leguminosarum bacilligerae intumescunt, in horto prope Soras Daniae. (Leg. H. Gram.)

EXPLANATION OF PLATE XXI.

Illustrating Messrs. Ferdinandsen and Winge's paper on *Clathrosorus*, a New Genus of Plasmodiophoraceae.

Fig. 1. Appearance of a specimen of *Campanula rapunculoides* infested by *Clathrosorus campanulae*. Nat. size.

Figs. 2 and 3. Young amoebae showing the characteristic nuclear divisions, anaphase and metaphase respectively. $\times 1,680$.

Fig. 4. Multinucleate amoeba in a host cell. $\times 750$.

Fig. 5. Multinucleate amoeba surrounding a part of plasma and the nucleus of the host cell. $\times 750$.

Fig. 6. Aggregation of spores in a host cell. $\times 570$.

Fig. 7. Section through a spore ball. $\times 700$.

Fig. 8. Section through two mature spores. $\times 1,680$.

Huth, London.

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