days was 29 grams for each rat. The growth curve for those on the non-sterile dry plants was closely parallel. The rats fed on the fresh Lemna put on weight faster and gained an average of 37 grams, suggesting that part of the vitamin was destroyed in the drying process.

The equal rate of growth made by the two groups receiving sterile and non-sterile plants not only shows that vitamin A can be formed in plants which have been free from all influence of microorganisms for hundreds of generations, but also is an indication that there is little or no difference in quantity produced. Further, while the non-sterile Lemna were grown by Mr. E. E. Frahm for the most part in sunshine, the sterile plants were produced altogether under artificial light—electric light bulbs in this case furnishing the illumination.[8]

From these results it appears that if conditions are favorable to the growth of green plants, the absence of microorganisms does not affect the formation of vitamin A and also that variation in light within limits has little effect. Virtanen and v. Hausen believe that the form or availability of nitrogen may be one of the controlling factors.

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FUSARIUM BACTRIDIOIDES SP. NOV., ASSOCIATED WITH CRONARTIUM

IN March, 1932, Arthur Hinckley at the Desert Botanical Laboratory, Tucson, Arizona, sent to L. N. Goodding, cooperating with the Oregon Experiment Station, Corvallis, a mummied cone of the Chihuahua pine (*Pinus leiophylla* Schlechtendahl and Chamisso) from the Chiricahua Mountains in Arizona. The cone had been attacked by the cone blister rust (*Cronartium conigenum* Hedgcock and Hunt). Mr. Goodding found this rust to be thoroughly parasitized by a species of Fusarium. The spores of this Fusarium were viable, and cultures were easily obtained from spore dilutions on potato agar. Through the courtesy of S. M. Zeller, Oregon Experiment Station, cultures of Goodding's Fusarium were transmitted to the undersigned, who has found the organism to be a new species in the Section *Discolor*. The diagnostic description is presented as follows:

Fusarium bactridioides Wollenweber, nova species (Sectio Discolor, subs. Trichothecioides): Conidia minora aerio mycelio ex albo incarnato instrata, numerosa, ovoidea v. ellipsoidea, continua 7.3 × 3.7 plerumque 5.9–9 × 3.4–3.9 (5–11 × 3–5), rarius 1–((2–)) sept. 13 × 4.7 pler. 11–14 × 4.2–5.1 (7–21 × 3–6.5), majora in sporodochiis v. pionnote roseo-aurantiaca nec non instrata, pulveracea, incarnata, stromate plus minusve atro-violacea saepe discolorata, alia cylindrica v. fusiformia utrinque obtusa, recta v. curvula, alia fusoideo-subfalcata utrinque ellipsoideo-conica, apice interdum leniter constricta, basi apiculata, raro subpedicellata, 3–5, rarius 6–, rarissime 7–11 septata; 3–sept. 32 × 5.6, pl. 24–26 × 5.2–6 (17–47 × 4.5–7); 5–sept. 41 × 6 pl. 31–50 × 5.5–6.7 (25–60 × 4.8–8); 7–sept. 46 × 6.2 pl. 40–50 × 5.5–6.7 (30–70 × 5–8). Chlamydosporae intercalares sparsae.

Hab. ad conum *Pini leiophyllae* Schlechtendahl & Chamisso, Arizona, socio *Cronartio conigeno* et ad cortices *Pini monticolae* socio *Cronartio ribicola*, et *Pini contortae* socio *Cronartio harknessii* et *Cronartio filamentoso*, Oregon.

Obs. Fungus a Fusario trichothecioide recedit macroconidiis crassioribus, interdum numero majori septorum idoneis, colore atro-violaceo stromatis, etc.

Fusarium bactridioides occurs naturally on diseased cone tissues produced by *Cronartium conigenum*. L. N. Goodding, however, has demonstrated its ability to attack other pine rusts by successful inoculations on *Cronartium ribicola*, *C. harknessii* and *C. filamentosum*.

The following note by Mr. Goodding is of interest in connection with the behavior of this Fusarium:

Inoculations with *F. bactridioides* were made on blister rust cankers on western white pine (*Pinus monticola*) in the region of Rhododendron, Clackamas County, Oregon, in July, 1932, and in four localities in Idaho and two in Oregon in July, 1933. Several reports have been received from Crystal Creek, Idaho, of numerous actively sporulating Fusarium infections on blister rust cankers which undoubtedly resulted from the inoculations made there. At Eagle Creek, Oregon, where blister rust attack is very abundant, fully 80 per cent. of the trees sprayed with Fusarium spores in July, 1933, showed all the blister rust cankers parasitized by the Fusarium by late October. In the case of July, 1933, inoculations on trees of *Pinus contorta* infected with *Cronartium harknessii* at Summit Meadows, Clackamas County, and with *C. filamentosum* near Tilly Jane Creek, Hood River County, Oregon, the Fusarium was found actively developing on both rusts by the latter part of October. All blister rust cankers inoculated in 1932 were dead by July, 1933. There is no doubt about the effectiveness of *F. bactridioides* in destroying *Cronartium ribicola* once it attacks the cankers.

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BOOKS RECEIVED

COKER, WILLIAM C. and HENRY R. TOTTEN. *Trees of the Southeastern States.* Pp. 399. Illustrated. University of North Carolina Press. $2.00.

MACBRIDE, THOMAS H. and G. W. MARTIN. *The Myxomycetes.* Pp. 338. 21 plates. Macmillan. $6.00.

NOWLAN, FREDERICK S. *Analytic Geometry.* Second edition. Pp. xii + 352. Illustrated. McGraw-Hill. $2.25.

[8] Clark, *Iowa State Jour. Sci.*, 7: 13–16, 1932.