None of the crystalline penicillins tested appreciably retarded germination.

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A New *Helminthosporium* Blight of Oats[1]

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A new *Helminthosporium* disease affecting mainly oat varieties and selections possessing the Victoria-type resistance to crown rust has become widespread in most oat-growing regions of the United States (*1, 2*). Although the first isolation from oats was made in November 1944, the organism was previously isolated from timothy seed. Numerous field isolations were obtained in 1945, and in the 1946 oat season infection was so severe in many areas as to cause serious reduction in yields. The fungus is known to have been present in 19 states in 1946, from Texas to New York and from Florida to Idaho.

Plants infected in the seedling stage were characterized by necrosis of the basal portions, and striping or reddening of the leaves, progressing upward from the lower leaves. The same symptoms were evident on plants in later stages of maturity, but the basal stem- and root-rot became the primary factors in identifying the disease, since striping and discoloration of leaves may be due to a number of causes. The leaf striping is believed to be a secondary toxic effect of basal infection. Mature plants in the field were blackened at the nodes with abundant sporulation of the fungus, and the lower internodes showed a characteristic brownish translucence. Culms weakened by severe infection broke over near the ground line and at the lower nodes, and excessive lodging made harvesting of many fields difficult.

The species of *Helminthosporium* responsible for this destructive disease of oats resembles three other members of the genus in several respects: *H. setariae* Sawada, *H. sacchari* Butler, and *H. sativum* Pam. King and Bakke. These similarities will be discussed in detail in a subsequent paper. Since, however, no description of a species of *Helminthosporium* which corresponds satisfactorily to this species has been found in the literature, it is proposed that it be recognized as a new species under the name *Helminthosporium victoriae*. This specific name is suggested because of the potential importance of this parasite as the cause of a foot-rot and leaf-stripe disease of oat varieties and selections possessing the Victoria resistance to crown rust (*Puccinia coronata avenae* (Corda) Eriks. & E. Henn.).

HELMINTHOSPORIUM VICTORIAE SP. NOV.

Conidiophoris erectis, simplicibus, pallide olivaceis usque brunneis, 60–280 × 5.8–10 μ, 4–10 septatis, apicibus geniculatis 30–80 μ; conidiis pallide olivaceis subcurvatis, elongato-ellipsoideis parte superiori plerumque angustiori, hilis aliquantulus protrudentibus, 40–130(70) × 11–25(15) μ, 4–11(8) septatis, muris modice tenuibus, tubulo uno e quaque cellula terminali germinantibus.

Hab.—In radicibus et culmis *Avenae sativae* L. (typus) et *A. byzantinae* C. Koch et hybridis inter eas parasiticus; et in plantis variis saprophyticus vel leniter parasiticus.

Conidiophores form velvety growth on lower nodes and sparse fructifications on basal leaf sheaths of mature oat plants. Conidiophores are erect, simple, emerging usually singly or occasionally in clusters of 2 to 5 from stomata or from between epidermal cells of infected culms, and measure 60–280 μ in length × 5.8–10 μ in width with 4–10 septa, mostly 120–160 μ × 6.5–7.8 μ with 6–8 septa; they are light olivaceous to medium brown and have a rather closely geniculated apical spore-producing area, 30–80 μ in length.

Conidia are fuliginous to dark olivaceous but typically light olivaceous, slightly curved, rounded at the base, widest near the center, and tapering to a rounded tip. Normal conidia measure 40–130(70) μ × 11–25(15) μ with 4–11(8) septa, have moderately thin walls, and germinate by one polar germ tube from each terminal cell, the basal germ tube emerging adjacent to the slightly protruding hilum. Conidia produced on water agar approach normality but are somewhat smaller and have fewer septa. Weathered spores at bases of mature plants in the field frequently are atypical, dark brown, irregular in shape, and with thick exospore. Typical cultures form a light- to medium-gray tufted colony on oat agar. One saltant, a profusely sporulating strain, produces a dark greenish-black colony.

The fungus is evident chiefly on the basal portions of *A. sativa* L. and *A. byzantina* C. Koch and hybrids between them, producing necrosis of roots and lower stem parts. On immature plants, it causes reddish-

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brown longitudinal foliar stripes and withering of leaves. It occurs also as a saprophyte or weak parasite on *Phleum pratense* L., *Dactylis glomerata* L., *Sorghum vulgare* Pers., *Agropyron cristatum* (L.) Gaertn., *Setaria viridis* (L.) Beauv., *Hordeum vulgare* L., *Paspalum notatum* Flügge, *Chloris Gayana* Kunth, and *Soja Max* (L.) Piper. It has been isolated from oats grown in 19 states, from Idaho to Texas eastward, in 1945 and 1946, and from the other-named hosts in and around Ames, Iowa, from 1942 to 1946. A collection of *A. sativa* var. Boone, made by the senior author at the Agronomy Farm, Iowa Agricultural Experiment Station, Ames, on 25 July 1946 is designated as the type (U. S. Department of Agriculture, Mycological Collections No. 71483). Portions of the type collection have been deposited in the Mycological Collections of the Bureau of Plant Industry, Beltsville, Maryland; in the herbarium of the Botany Department, Iowa State College, Ames; and in the Farlow Herbarium, Harvard University, Cambridge, Massachusetts.

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Maintenance of Penicillin Blood Levels After a Single Intramuscular Injection of Penicillin in Various Oils

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This is a preliminary report on a study being made to determine the most satisfactory diluent for penicillin from the standpoint of maintaining a blood level of 0.1 unit/ml. over a period of 24 hours after a single intramuscular injection.

The diluents tested were peanut oil, cottonseed oil, soybean oil, hydrogenated peanut oils (melting points, 40° C. and 50° C.), hydrogenated soybean oil (melting point, 40° C.), and a commercially prepared mixture in which the penicillin was suspended in peanut oil and 4.8 per cent beeswax[1] from two pharmaceutical companies. The penicillin was mixed with each diluent in the amount of 300,000 units/ml. The doses injected were 300,000 units (1 ml.), 1,000,000 units (3.3 ml.), 1,500,000 units (5 ml.), and 2,000,000 units (6.7 ml.), the majority of doses being 1,000,000 units. So far, 254 injections of penicillin in various oils have been given to 36 ambulatory patients, all but two of whom were syphilitics.

Penicillin blood levels have been determined by the Hobby method (*2*) and checked by a modification of the Kirby-Rantz method (*3*). The streptococcal inhibiting factor in human sera, as described by Elias (*1*), was tested for in some 10 patients, and of all the specimens assayed, none showed a streptococcal inhibiting factor.

It should be emphasized that there has been a remarkable variability in blood levels taken at stated times from different patients receiving the same dose at the same intervals. This variability has been noted by other workers in similar studies.

In cases treated to date we can state that hydrogenated oils delayed the absorption of penicillin more than the plain oils.

A prolonged high level was observed most frequently after the use of either hydrogenated cottonseed oil (melting point, 40° C.) or the penicillin-beeswax-peanut oil mixture when tested following a 300,000-unit or a 1,000,000-unit dose of penicillin.

A dose of 300,000 units of penicillin in hydrogenated cottonseed oil maintained a 0.1 unit/ml. penicillin level for at least 6 hours in about 80 per cent of the cases, while in the beeswax-peanut oil mixture it maintained that level in 66 per cent of the cases. Twelve hours after injection of 300,000 units in hydrogenated cottonseed oil only about 16 per cent of the cases had a 0.1 unit/ml. penicillin level, while the beeswax-peanut oil mixture had no 0.1 unit/ml. levels. In a 1,000,000-unit dose these two preparations gave a 24-hour penicillin blood level of at least 0.1 unit/ml. in 38 and 40 per cent of the cases, respectively, as well as producing higher penicillin blood levels at the 6- and 12-hour intervals after injection. In general, our results from either of these preparations have been very similar, although from our experience with the extemporaneous preparation of a suspension of penicillin in hydrogenated cottonseed oil it has seemed to have a practical advantage over the penicillin-beeswax-peanut oil mixture in that it melted considerably more rapidly under a hot-water tap, was less viscid at any given temperature, and stayed liquid longer after having been heated.

At this early date we can make no statement regarding the therapeutic value of daily injections of either preparation in the treatment of syphilis, except to say that the serological results so far have been encouraging. The follow-up period has been sufficiently long for 6 out of 19 seropositive primary and secondary syphilitics to have given negative serological tests in an average of 60 days.

Summary. Experiments with various oily diluents for penicillin indicated that of the oils tested, peanut oil with 4.8 per cent beeswax, and hydrogenated cot-

[1] As advocated by Romansky and Rittman (*Science*, 1944, **100**, 196).