

## FURTHER NOTES ON TIMOTHY RUST.

BY A. G. JOHNSON.

At the last two annual meetings of the Academy, papers on timothy rust, [*Puccinia poeciliformis* (Jacq.) Wettst.], were presented by Mr. Frank D. Kern, and it is of interest to note at this time the present known distribution of the disease over the State as well as to record here the extension of its range into other States and provinces from which it has not been previously reported.

As was predicted in Mr. Kern's papers, the distribution of the rust has become more general. In this State it evidently occurs wherever timothy is raised. During the past season the writer has collected it at widely separated points, as follows: Mount Vernon (Posey Co.) on the southwest; Wirt (Jefferson Co.) to the southeast; Richmond (Wayne Co.), east central; Columbia City (Whitley Co.), Laketon (Wabash Co.), and Logansport (Cass Co.), north central; LaFayette (Tippecanoe Co.), west central. Besides these collections, specimens of the rust have been received from Mr. Guy West Wilson and Mr. C. D. Learn, both collections from Carmel (Hamilton Co.), central; and it was reported last year from Columbus (Bartholomew Co.). This covers the State in such a way as to lead one to be reasonably certain that the rust occurs throughout the State wherever its host does.

In addition to the states and provinces from which the rust has been previously reported, specimens have been received from Dr. E. W. Olive, collected at Brookings, S. Dak., who reports it as common there this year, although not previously seen; from Miss Irma A. Uhde, collected at Lake Okoboji, Iowa; and from Prof. W. P. Fraser, Pictou, Nova Scotia. These localities in addition to those noted in Mr. Kern's paper last year make the known distribution of this rust in North America as follows. S. Dakota, Minnesota, Iowa, Wisconsin, Indiana, Ontario, New York, Maine and Nova Scotia.

In most of the specimens seen, especially those from Indiana, the summer spores (urediniospores) were much the more abundant. Winter spores (teliospores) developed in some cases but not abundantly. In certain

places in Jefferson County, the rust in its uredinial stage was abundant this year. The rainy season in the southern part of the State favored the development of the fungus.

At LaFayette, on the Experiment Station farm, the uredinial stage of the rust is abundant in a timothy meadow, which was sown down this spring. The rust is most abundant in the low parts of the meadow, and even as late as at this writing (Nov. 22nd<sup>1</sup>) the rust sori are abundant on the green blades.

The vitality of the urediniospores, collected at LaFayette, Ind., Nov. 22nd, 1910, was tested by means of hanging drops in Van Tiegham cells. Spores were taken both from the green blades and from those that had been killed by the frost. While the former showed much the more vigorous germination, the vitality of the spores in both cases proved to be high. This shows that they have withstood the cold weather, thus far, very well, and points to the probability that the rust may be able to pass the winter here in the uredinial stage, as it is thought to do in Europe.

From the above conditions it seems evident that timothy rust is in North America to stay, and its abundance will doubtless vary with the varying conditions that favor or check its development. Some of the conditions that seem to favor the development of the fungus are a heavy, luxuriant growth of the host on ground that tends to hold moisture, along with rainy weather with cool nights and moderately still, warm, but not hot, days. Obviously, the opposite set of conditions tend to be unfavorable for the greatest development of the rust.

While the best possible attention to both air and soil drainage will no doubt lessen the attacks of the disease to some extent, yet its ultimate control doubtless lies in the field of the plant breeder. The production of a strain of timothy having a high resistance to rust, as well as having at the same time the best forage qualities, would be of vast importance.

*Purdue University Agricultural Experiment Station, Lafayette, Ind.*

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<sup>1</sup> 18 F. is the minimum thus far (Nov. 22d) at Lafayette, according to the official reading of the U. S. Weather Bureau at this station.