

35. *Hedeoma pulegioides* L.
 36. *Lycopus rubellus* Moench.
 37. *Mentha piperita* L.
 38. *Mimulus alatus* Soland.
 39. *Plantago major* L.
 40. *Micrampelis lobata* (Michx.) Greene.
 41. *Lactuca Scariola* L.
 42. *Lactuca Canadensis* L.
 43. *Ambrosia trifida* L.
 44. *Xanthium strumarium* L.
 45. *Vernonica* sp—.
 46. *Eupatorium perfoliatum* L.
 47. *Solidago Canadensis* L.
 48. *Erigeron Philadelphicus* L.
 49. *Bidens laevis* (L.) B. S. P.
 50. *Bidens frondosa* L.
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THE GERMINATIVE POWER OF THE CONIDIA OF *ASPERGILLUS* *ORYZÆ*.

MARY F. HILLER.

Former investigations of the mould, *Aspergillus oryzae*, have resulted in many practical suggestions which have determined this mould to be of interest to the commercial as well as to the scientific public.

In 1876 Ahlburg, the first investigator of the mould, described the fungus and named it *Eurotium oryzae*. Cohn, in 1883, in his study of moulds as industrial factors, called it *Aspergillus oryzae*. Büsgen, in 1883, gave the first complete description of this mould, and in 1893 Wehmer attempted a structural study. From this time many investigators were at work in many different laboratories working out the life history of the fungus. It was Takamine, a Japanese chemist, who introduced *Aspergillus oryzae* into the laboratories of this country.

The careful experiments of many investigators, among whom are Jörgensen, Hansen, Klover, also Atkinson and Hoffman, who have treated it from the industrial standpoint, have resulted in suggesting for this mould many interesting properties, such as the claims that the mycelium,

in developing, secretes a diastatic ferment and that under certain conditions of growth the mould is convertible into yeast. These two properties alone would establish its value to the commercial world aside from its scientific interest.

The object of the following experiments is to study the germinative power of the conidia of *Aspergillus oryzae*, the plan being to test the conidia of various ages in different media.

This study was suggested by a statement of Wehmer's to the effect that neither the age of the inoculating material, nor the medium upon which it has been grown, affect the germinative power of the conidia.

The material used in these experiments was taken from cultures germinated upon the following media: Wort (obtained from the brewery, unfermented, but after having been hopped), wort-gelatine (wort fortified with ten per cent. gelatine), dextrose, rice, bran, also some of the so-called original material which had been obtained from Takamine. These cultures, which were seventeen in number, covered the dates of March 29, 1897, to November 26, 1898.

A new series of cultures were made from these seventeen cultures, which varied in age from two years and eleven months to four years and seven months, the testing medium being wort. Upon examination of these cultures the following results were obtained: Cultures obtained from the six, grown originally upon wort, and which varied in age from two years and eleven months to three years and seven months, had been germinated and the mould was in a vigorous and advanced stage of growth. Those cultures taken from bran, rice, wort-gelatine and the original material failed to show any signs of germination.

In the second series of cultures the medium of germination used was wort-gelatine. Upon examination of these cultures at various dates, it was found that the six taken from the wort cultures had germinated and the mould had grown vigorously, while those cultures taken from bran, rice, etc., had failed as in series number one.

Pasteur solution was the medium used in the third series of cultures. The results obtained were the same as the results from series one and two, the six cultures taken from wort having germinated and all others having failed.

The fourth series, the testing medium bouillon, gave the following results: Six cultures taken from wort grew, also one taken from bran,

which was four years and six months of age, the cultures from wort-gelatine, rice and the original material having failed.

For a fifth series of cultures gelatine was added to beef broth, and the results of these cultures were the six from wort grew, the fungus being in a vigorous state, also one from wort-gelatine, which was three years of age, the growth not being vigorous; cultures from bran, rice, original material and the remaining four of wort-gelatine failed.

The series of moist chambers in which a drop of wort was used was then made, and the following were the results obtained: Germination had taken place in cultures obtained from rice three years and nine months of age, one from wort-gelatine three years of age and the six from wort. Those failed which had been obtained from cultures on bran, dextrose, original material and the remaining four on wort-gelatine.

A series of cultures was also made using Pasteur solution and alcohol to normal solution, but no results at all were obtained, germination having failed in every culture.

New cultures were made in wort from the original cultures which had germinated in just one or two testing media and were as follows: One from wort-gelatine which was three years of age and had germinated in beef broth and gelatine; one from rice three years and eight months of age, which had germinated in the moist chamber, wort having been used; one from bran four years and six months old, which had germinated in bouillon; one from wort-gelatine three years old. It had germinated in the moist chamber. These four cultures failed to give any sign of germination. From this result it is suggested that the cutting off of the air supply had permitted the conidia to germinate in wort in the moist chamber where the test tube cultures in wort failed to promote germination.

A microscopical examination was made of the conidia from cultures of various media and dates, the following being the conidia examined: Those from original cultures in wort, wort-gelatine, dextrose, from cultures of Series I, in which wort was the medium; Series III, Pasteur solution the medium; Series IV, bouillon the medium. In these examinations the conidia showed no apparent difference.

The tabular form of these experiments and the results obtained from them suggests the following conclusions:

First.—The germinative power of the conidia of *Aspergillus oryzae* is dependent upon the medium upon which the inoculating material has been grown.

Second.—The age of the inoculating material in these experiments varied from two years and eleven months to four years and seven months, and from results obtained the germinative power lessens with age.

Third.—(a) Some media are decidedly favorable to the fungus in retaining its vitality. Example 1: Wort, all cultures from it having germinated in each of the six testing media. (b) Other media are favorable under certain conditions. Example: Wort-gelatine. Out of five cultures one grew in one of the testing media. (c) Still other media are decidedly unfavorable. Example: Dextrose, cultures from it having failed throughout the experiments.

Fourth.—Alcohol is not stimulating to the conidia of *Aspergillus oryzae*.

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SPORE RESISTANCE OF LOOSE SMUT OF WHEAT TO FORMALIN AND HOT WATER.

WILLIAM STUART.

The comparative absence of any definite knowledge of the spore resistance of the loose smut of wheat to formalin and hot water, and the lack of any efficient method of preventing losses to the wheat crop from it, seem to invite some attention to this phase of the question. In a measure