

Letters to the Editor.

Observations on *Tolyposporium penicillariæ*
Bref. (The Bajri Smut Fungus).

A SMUT disease has long been known to occur on Bajri (*Pennisetum typhoideum* Rich.), one of the staple crops of Gujarat and, although in ordinary years it does not cause serious loss, in wet years the damage to the crop may be appreciable.

Beyond the identification of the causal fungus and the observation that the germination of the spore-balls is "scanty and difficult"¹ no work had been done on this disease until 1930 when one of the writers of this note (S.L.A.) reported the successful germination of the spore-balls readily taking place on several artificial media.² Since that time the disease has been further studied jointly by the writers at Ahmedabad and Baroda. The fungus has been studied in the field and in the laboratory and inoculation experiments have been carried out.

The main conclusions reached so far in this work are summarised below:—

(1) The fungus can be easily cultivated by sowing spore-balls on corn meal, Bajri meal and Jowar meal agar, and on boiled potato and boiled carrot. The sporidia multiply indefinitely by budding on these media. Very little mycelium is formed on any of the media tried and the growth consists almost entirely of sporidia.

Cultures of the fungus were also easily obtained by aseptically opening unripe, green-affected grains and suspending the whole mass of white mycelial ball found within on malt-agar slants.

(2) Infection takes place at the flowering stage of the host as in wheat, but no dormant mycelium in the infected grains is formed in the case of Bajri smut, the infection being followed in about two weeks from the date of inoculation by the formation of spore-balls.

(3) No other part of the host plant seems to be vulnerable to the attack of the fungus, though in one case the inoculation experiments carried out at Ahmedabad suggest the possibility of successful wound infection through pin pricks of the shoot. In any case, no part of the host plant, other than the grain, develops the spore-balls. Many

grains in an affected ear escape infection. Even in the same spikelet one grain may be affected while the rest remain healthy.

(4) Microscopic study of the affected grains in various stages of development has shown that the fungus occupies the space between the pericarp and the aleurone layer and forms its spore-balls after gradually exhausting the starchy endosperm. In the beginning a peculiar white mycelium is found to exist in the affected grain. The nuclei in this mycelium are long, streak-like. The dark chlamydospore-balls are developed at the cost of this mycelium.

(5) Contrary to what has been previously believed³, no resting period is necessary for the spore-balls to germinate at least on artificial media.

(6) Seed treatment with copper sulphate and sulphur is entirely unsuccessful in the case of this smut.

(7) None of the common varieties of Bajri is immune to this disease.

(8) The attack of the disease is more severe in wet seasons than in dry ones and more severe in those ears which come out during wet weather than in those which come out in dry weather. The later ears (formed when the weather is dry) even on plants which had earlier shown the disease have been found to have escaped the disease. This points to the possibility of dodging the disease by adjustment of the sowing date and by selection of late varieties.

The source of infection of the first grains in any season is still a mystery, for, although the spore-balls have been ascertained to retain their germinating capacity for at least two years, they have not been so far found to germinate except on artificial media. A close study of the behaviour of the spore-balls as they lie in the soil and also of weed grasses in Bajri fields as possible alternate hosts for the fungus may lead to the solution of this mystery.

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¹ Butler, E. J., *Fungi and Disease in Plants*, p. 225.

² Ajrekar, S. L., *Proc. Ind. Sci. Congress, Bot. Sec.*, 1931.

³ Butler, E. J., *Fungi and Disease in Plants*, p. 226.