

II.

SPECIAL PART.

DESCRIPTION OF VARIOUS SMUT DISEASES, THEIR LIFE HISTORY AND TREATMENT.

1. 'STINKING' OR 'BUNT' SMUT OF WHEAT.

(Plate 2, Fig. b, c.)

The term 'stinking' smut, though of a somewhat striking character, is nevertheless correctly applied to this form of smut. The experienced farmer will readily discover its presence in seed wheat, even to a limited extent, by the peculiar, decidedly unpleasant odour. This odour is due to a volatile alkaloid technically known as Trimethylamine, which reminds one of the pungent odour of herring brine, from which indeed it may be chemically obtained. The odour persists for a considerable time and affords an excellent clue to the buyer of seed wheat which may be contaminated by the spores of this smut.

Stinking smut, like all the smut diseases, is due to a microscopic fungus, or rather, two distinct fungi, one a smooth-spored variety far less frequent in Canada (*Tilletia foetens* (B. & C.) Trel.), and the other far more common variety with reticulated or net-like markings on the surface of the spores (*Tilletia Trilici* (Bjerk.) Winter) (plate 8, fig. 1). Many smutted ears of wheat have been examined in this laboratory but none contained the characteristic, smooth spores of the first variety. For the purpose of this bulletin, it matters little whether stinking smut has been due to the one or the other species of fungus, for they both respond to the preventive treatment in a manner equally satisfactory.

Appearance in the field.—Where no precaution has been taken and smutty grain has been used for seed, the disease will not become noticeable until the ears have reached a certain stage of maturity, when those containing the germ of disease will appear darker green—bluish almost—and remain so much longer than the normal, uninfected ears. The affected ears will stand invariably more erect, while those containing the ripening grain—steadily increasing in weight—will slightly bend down. On pulling one of the suspicious-looking ears and examining it more closely, we find that instead of normal grains, the ear will contain bodies somewhat larger in size and decidedly plumper and shorter (plate 1, fig. e, f). This enlargement of the grain is the reason for the loose, open appearance of the ear, which will become more prominent as the ear matures, until finally the grain-like bodies are readily visible from the outside. On removing a kernel from an infested wheat ear, there will be found another external difference from the normal wheat grain in the form of a short spur at the apex of the grain (plate 1, fig. e). Upon squeezing one of these bodies between finger and thumb, the skin will burst open and a dark-coloured smeary or dusty substance, according to the stage of ripeness, will exude (plate 1, fig. f) which strongly smells of herring brine. This substance is entirely composed of the fungus spores. Under ordinary circumstances these grains, or, correctly speaking, 'smut balls,' do not burst open while in the field, and the infected ears are harvested with the sound ones.

The fungus spores.—When such wheat is subsequently threshed, a large number of the smut balls are broken, and the now free spores will infest the sound wheat grains. When badly-infected wheat is being threshed, the spores are present in such large numbers that one may often notice a black cloud issuing from the threshing machine. It is not generally realized that there may be from two to three millions of