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THE FOUL MATERIALS IN WHEAT.

An Original Investigation

Made by

George N. Gould,

During the Winter Term

At the

Michigan Agricultural College.

1899.

B. S.

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The Foul Materials in Wheat.

The object of this investigation was to find out the different substances which the farmer sells with his wheat, and to determine, in a way, the various weeds which are grown and harvested with the wheat. In order to carry out this investigation, several samples of screenings were secured from the different parts in the various mills in Lansing and Okemos. Each sample was examined separately and the several substances were placed in separate bottles for future reference. In all the samples examined forty-two different kinds of substances were present.

Following is a list of the various seeds and foul stuffs found:-

Beans,	broken wheat,	bull thistle,
bit of rotten wood,	Canada thistle,	chess,
clover,	cockle,	curled leaf dock,
cherry buds,	cat tails	excrement of fouls,
excrement of insects,	green foxtail,	June grass,
knot grass,	oats,	pigeon grass,
pig weed,	portions of insects,	heads of June grass,
prickley lettuce,	pitch forks, (stick tights)	
rye,	sand and gravel,	small stones,
stem of rag weed,	smart weed,	smut,

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straws other than wheat, shrunken wheat, tips of wheat, white caps, wheat weavel, (granara calandre), wheat thief, (red root), young cockle,

Out of this list might be selected rye, chess, red root and cockle as the worst ones with which the farmer has to contend.

In identifying the different substances, I have been helped by Dr. Beal, Prof. Wheeler and Mr. Pettit, and have had access to the extensive collection of seeds prepared by the late Mr. Hicks for comparison.

In classifying the various seeds, I find that they belong to the seven different families as follows:-

Amarantaceae, pig weed.

Compositae, common purple thistle, Canada thistle, bidens frondosis, burdock, prickly lettuce.

Caryophyllaceae, cockle.

Gramineae, rye, oats, chess, foxtail.

Haemodoraceae, wheat thief (red root).

Leguminosae, clover.

Polygonaceae, sorrel, smart weed, dock.

It may be of interest to those who have never visited the flouring mills to know just how the various substances are separated from the wheat. After the grain has been thrown into the hopper and weighed, it is elevated to the top of the mill

where it passes over a series of sieves, the first one having a mesh sufficiently large to allow the kernel of wheat to pass through, but will retain the larger substances such as straws, stick, etc. The wheat next passes over a somewhat finer sieve, which retains the wheat and allows the finer materials to pass through. The wheat thus separated from the large and small materials, next passes into a rapidly revolving cylinder and the wheat is thrown with great velocity against its side. This striking or rubbing in some cases, tends to knock off the dust, smut, small hairs and other materials which may have collected and thus the kernel is made perfectly clean. This revolving cylinder which I have just described is what is known to the miller as the "Smutter". After the wheat has passed through this machine, it next goes over to a fine sieve which has a strong up draft, caused by a rapid revolving fan in the end of a long tube, much the same as the dusters in large saw-mills. Here, by means of this up draft, the wheat is freed from the last traces of foul material and is ready to be made into flour. The weed which most often escapes being removed and causes the miller much trouble is the cockle; owing to its size, being nearly equal to that of the wheat, and its weight, it is often ground into flour and is very objectionable, as the dark covering forms black specks in the product.

The topic of weeds is extremely interesting from two

practical standpoints, namely, that of the miller, and of the farmer. It is of interest to the farmer, not only on account of their adding weight to the grain, but from the fact that it requires a considerable amount of labor and machinery to remove them. From the farmer's standpoint it is interesting from the fact that he may know such weeds are liable to be found and may thus be constantly on the alert for them. Many weeds have become so abundant and of long standing that the average farmer passes them by unnoticed. Those weeds are rarely considered by many as such; they are, however, objectionable, and every precaution should be taken to exterminate them.

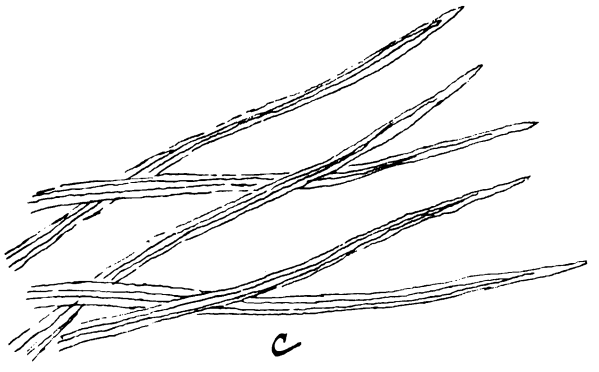
To tell how to kill the various weeds would be too long a story to begin at this time, but the annual weed may be checked by digging and cutting down before they seed. This would exterminate the weed, once for all, were it not for the fact that many seeds, when buried in the ground, will retain their vitality for six, eight and sometimes fifteen years, and then, if brought under favorable circumstances, will germinate and produce other crops. So, the farmer must be constantly on guard in order to make any headway towards destroying them. In the cases of perennial and biennial weeds, the treatment is different. If the plants are but few in number, the tops may be cut off, just below the crown, and common salt or crude sulphuric acid, dropped on the fresh cut, will be found very

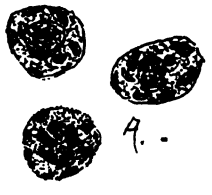
effectual. If the patch is large, thorough cultivation, so thorough that not a spear of green is allowed to appear above the surface, will in a comparatively short time, starve the plant to death and further annoyance will be prevented.

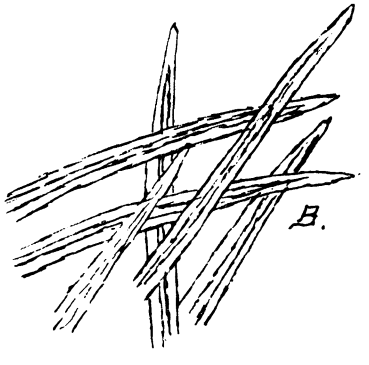
In case of the weeds referred to as being the worst ones in wheat, rye, chess, cockle and red root, after they once have started to grow, little can be done to check them or to prevent them from seeding unless they are pulled up by the roots. This is a tedious job, but in many cases it must be done in order that the wheat may be marketed, as the majority of millers at the present time refuse to buy wheat which contains these substances, and especially are they prejudiced against rye. So it is of the utmost importance that the grain raisers keep a constant watch upon their fields and prevent the growth of any obnoxious plants.

In the case of stored grains there is great liability, if kept for sometime, for the grain to become infested with small beetles which bore into the kernel, or with the larva of an insect, which lives upon the grain. Both of these pests may be destroyed by the fumes of carbon bisulphide, one pound to one hundred cubic feet of air space, or formaline. The former is very explosive when brought in contact with a flame and hence there should be great caution in using it. With formaline, though comparatively a new substance to us, it has proven

very effective, and its use is to be recommended over that of carbon bisulphide.







These Drawings Represent some of the dust found, examined under the microscope

A Represents the spores of smut

B the hair like substance On end of wheat Kernel

C. Shows some of the hairs from June Grass.

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