July 2017

Some botanical notes on corn.

L. H. Pammel
Iowa State College

Robert Combs
Iowa State College

Follow this and additional works at: http://lib.dr.iastate.edu/bulletin

Part of the Agriculture Commons, Agronomy and Crop Sciences Commons, and the Botany Commons

Recommended Citation
Available at: http://lib.dr.iastate.edu/bulletin/vol3/iss36/3

This Article is brought to you for free and open access by the Extension and Experiment Station Publications at Iowa State University Digital Repository. It has been accepted for inclusion in Bulletin by an authorized editor of Iowa State University Digital Repository. For more information, please contact digirep@iastate.edu.
Some Botanical Notes on Corn.

L. H. PAMMEL.

ROBERT COMBS.

Abstract from annual report Iowa Agricultural Experiment Station 1897.

VALUE OF CORN CROP.

Corn is one of the chief crops of the Iowa farmer. In point of importance it is exceeded in value only by the hay crop, thus the tenth United States census records the yield of corn for Iowa at 275,014,247 bushels, and the eleventh census gives the yield of corn for Iowa at 313,130,782 bushels. Mr. Sage, of the Iowa Weather Service, reports the total yield of corn for Iowa in 1895 at 313,692,210 bushels, having a value of $43,916,909.40, and that last year's hay and pasturage was valued at $57,866.480.

It would seem proper for us to bring together in a compact and concise form some of the general facts of the growth, diseases, and economic uses of this great staple cereal.

TROPICAL ORIGIN OF CORN.

America has furnished the old world with two very important economic plants. The importance of the potato to civilized man is well known. Both of these plants were known and cultivated by the aborigines, and taken to Europe by the early voyageurs. Botanists are agreed that corn originated in America, this is shown by archaeological, historical, ethnological, botanical and meteorological proofs. Harshberger in an extensive memoir on the subject, locates the region in Lower Mexico south of the 22 degree north latitude at an altitude of about 5,400 feet. This would
locate its original home near Moro Leon, the locality where Prof. Duges in 1888 discovered nea canina, at one time supposed to be a new species of corn, but now generally believed to be a reversion.

No other agricultural plant has adapted itself to so wide a range of latitude as corn, except perhaps sorghum. It may be interesting to observe that both of these plants originated in a warm climate. It would seem, however, that corn may still be improved either by selection or by cross fertilization. Some experiments have been conducted with Mexican and South American varieties on the college grounds; these results obtained seem to indicate that the Mexican plants possess a wonderful power of resisting drouth and that by cross fertilization and proper selection of seed, their period of maturity may be very much shortened, and thereby a variety may be obtained which will stand the dryer parts of the west and northwest and give a satisfactory yield.

Fig. 1 a.

No 1. Mexican.
" 2. Mexican.
" 3. Dent Corn (legal tender.)
" 4. Dent corn.
" 5. Sweet corn.
" 6. Pop corn.
" 7. Primitive corn or Husk Maize.
" 8. Dent corn (Mortgage lifter.)
" 10. Dent corn.
" 11. Flint corn.

http://lib.dr.iastate.edu/bulletin/vol3/iss36/3
The flowers of grasses are as a rule monoecious, that is, the staminate flowers are borne in flowers separate from the pistillate. The staminate flowers constitute the tassel. The pistillate flowers form the so-called cob. These are shown in figure 2.

When the stamens are mature the pollen shakes out, it is carried by the wind and falls on the long plumose stigmas or "silks" as they are called (fig.2, s). The pollen grain germinates producing a tube; this tube passes down through the style and fertilizes a special cell in the young ovule. After fertilizing the cell dries and the kernel begins to grow. The matured kernel is not a seed like the bean, pea or mustard, but a fruit, the seed coat being very closely united to the wall of the ovary or pod. A section of this seed placed under a microscope shows that the outer part consists of thick walled cells (a) and (c) in fig. 3. The cells of the testa are thinner walled and much smaller than those of the capsule or
pod. The testa is followed by the aleurone layer (a). This in the colored varieties contains pigment. It is filled with protein matter. This layer is followed by cells containing the starch(s).

GERMINATION.

During the spring of 1897 many fears were entertained that seed corn crop of 1896 would not germinate. It therefore seemed desirable to make some extensive germination tests. The tests made indicate that the 1896 corn germinated well, nevertheless many fields had a poor stand, no doubt in part due to the puddled condition of the soil, as well as the cool and continued rainy weather of May and a part of June, which caused much of the seed planted to rot. This rot was brought about by moulds, chiefly the common blue mould, Penicillium glaucum.

We append here a short table showing some of the results of germination tests.
The results of the tests show that although corn germinated well in the laboratory and greenhouse there was a slight loss in the field. There is a further loss of vitality due to age as shown in germination tests of April compared with those of September.
Corn in Iowa is subject to three well known diseases; corn smut, which is universally distributed, the percentage of loss varying from one-half of one percent to one percent, but the average field loss is not much more than seventy-five hundredths of one percent. On this basis the state would lose in round numbers $329,376.81. This does not take into account the smut on leaves and stalks. It would be hard to make an estimate of the total damage.

Corn rust is decidedly prevalent, some years affecting some varieties of corn much worse than others, especially sweet corn. It materially lessens the yield. This disease is easily recognized by the brown or black pustules occurring along the veins of the leaf, these contain the spores or reproductive bodies. It has been demonstrated that corn smut is not injurious to stock as has been frequently claimed.

The third disease prevailing at some times is what is known as bacteriosis or the Burrill disease of corn. This disease, Billings claims, is identical with the corn stalk disease. It has been shown, however, that the organism producing this disease has nothing whatever to do with the corn stalk disease, and that the cause of the Burrill disease is a widespread soil organism *Bacillus cloaceae*. 
Finally there is a short discussion on the subject of weeds and corn cultivation. The most troublesome weed for Iowa farmers is foxtail (*Setaria viridis*). It is universally distributed; this and pigeon grass cost the Iowa farmer more than all other weeds put together. Northern nut grass (*Cyperus esculentus*) an early spring sedge is also troublesome. There are numerous border weeds like ragweed in many places but these seldom cause the farmer much trouble.