The feature which is general for the family is that the stamens are attached to the calyx or to a rim projecting from a cup-shaped tip of the stem. This is well illustrated in the rose, where the pistils are attached to the lower part of the cup, the stamens, sepals and petals at the top. The wall of this cup becomes the fleshy part of the mature fruit. The individual pistils develop into one-seeded fruits which are called nutlets because of the hard thick covering.

In the apple group, the pistils are only two to five and are grown together at the base. The stem tip surrounds them and it becomes soft and fleshy in fruit. Our only native species are Juneberries and hawthorn. Both of these groups are puzzling as to identity of species. The simplest treatment is to regard the Juneberries as a single species and the hawthorns as chiefly one **(Crataegus rotundifolia)** which ripens early and has small, soft fruits. A second hawthorn **(C. mollis)**, occurs in the eastern part of the State. The fruit is half to three fourths of an inch in diameter, ripens late and remains firm. It is quite worth growing as an ornamental and for the fruit. The cotoneasters, now commonly grown as ornamentals, are members of this group.

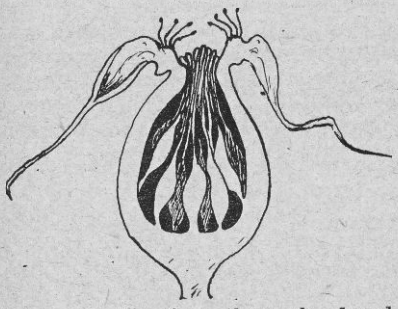

Figure 3. Section through developing rose fruit. Here the stem tip is vase-shaped, surrounds the single fruits and becomes fleshy.

The flowers of plums and cherries have a single pistil and it is the only part which develops in the fruit. The sepal lobes, petals and stamens are borne on a thin cup which falls or dries up after blooming. The wild plum and chokecherry are our only common species. The Sand Cherry is found locally, mostly in the southern part of the State. The Bird Cherry or Pin Cherry occurs in wooded areas in the northeast.

Planning the Fight Against the European Corn Borer in the North Central States

By
WILLIAM WIDAKAS, Assistant Agronomist

THE corn breeders and some of the entomoligists concerned with the development of corn resistant to the European Corn Borer, recently held a conference at Purdue University, Lafayette, Indiana. The North Dakota Agricultural Experiment Station was represented by the writer. Research workers from the United States Department of Agriculture and from several North Central states attended. Director H. J. Reed of the Indiana Agricultural Experiment Station represented the directors of the North Central Experiment Stations of the United States at this conference.

The purpose of this meeting was to familiarize all the corn breeders, entomologists, and others concerned with the spread of the corn borer and with the extent of the damage it is causing,

and to assemble all the information into a "Pool of Information" so that unnecessary duplication of effort would be avoided, and so that research can be guided into more productive channels.

Spread of the Corn Borer

The European Corn Borer made a new and rapid spread west and north in 1944, particularly in Iowa, Minnesota, and Wisconsin. New areas of its occurrence were also reported in Missouri, Kentucky, Virginia, Tennessee, North Carolina, Kansas, and Nebraska. The most rapid spread appeared to be in areas of high humidity and heavy rains in the 1944 season. The corn borer was most abundant in the extreme western corn belt, especially in Illinois and Iowa, whereas under the drought or near drought conditions in Indiana and other more easterly states it was not as abundant in 1944 as in 1943. An official survey report shows the European Corn Borer about 200 miles from the southeast corner of North Dakota. Surveys made by the North Dakota Station Entomologist have as yet revealed no European Corn Borer in this State.

The Southwestern Stalk Borer

Southwestern Kansas has reported extensive damage from the southwestern stalk borer. This borer appears to have come into the southern states from Mexico.

Control of European Corn Borer

Control practices such as cleaning up infested corn stalks, the shredding of corn stalks left in the field and other cultural practices that destroy the borer are recommended. These practices, however, must be conducted on a county or state-wide basis and must have nearly 100 percent coverage and efficiency in order to be effective. The degree of effectiveness of the control practices seems to be complicated because the borer may infest weeds and other host plants, thus over-wintering and causing a new infestation.

Biological control has been studied by the Bureau of Entomology and Plant Quarantine of the United States Department of Agriculture. This Federal bureau has introduced some 23 species of corn borer parasites of which some six appear to be established in the eastern part of the United States while others are not well adapted. Some insecticide dusts with rotenone base have given satisfactory control of the borer in sweet corn fields. This, however, is not very practical in large field corn acreages.

Breeding for European Corn Borer resistance or tolerance to it is in progress in many state Experiment Stations and by several workers in the United States Department of Agriculture. Progress in breeding corn for borer resistance or tolerance is made even more difficult by the rapid increase of multiple generation borer strains. Some inbred strains of corn, susceptible to the corn borer, nevertheless yield fairly heavy and are termed borer tolerant. Other strains appear to be resistant to the borer infestation. There is a third type of resistance described as "low borer survival" strains in which heavy initial infestation takes place but comparatively few of the borers survive. Some of the borer susceptible strains have many desirable agronomic characters, and an attempt is being made by the corn breeders to transfer these desirable characters to strains having borer resistance through a system of crossing and back-crossing.

Some research workers have found a high correlation between borer susceptibility and susceptibility to diplodia stalk rot and to certain other corn diseases.

Recommendations of the Conference

The conference made the following recommendations:

1. Inbred lines of corn should be tested for borer resistance under

heavy borer infestation in such areas as Lafayette or Toledo. (Artificial inoculation of corn borer eggs into corn stalks in corn borer areas was suggested.)

2. Cross widely used inbred lines with the borer susceptible "tester" lines and have them evaluated in the borer infested area at Toledo or Lafayette.

3. At Stations where the corn borer is absent, inbred lines should be tested for resistance to diplodia stalk rot and corn aphids.

4. Create a synthetic variety involving borer resistance inbred lines (10-14 lines) in order to meet the need for borer resistant varieties and in order to have a source from which new borer resistant lines may be selected.

5. Survey and test all prominent domestic varieties and foreign introductions for borer resistance.

6. Make a further study of plant characters and of the habits of the corn borer larvae in order to have a more simple and rapid method for evaluating the reaction of lines and hybrids in the field.

The selection of inbred lines for a synthetic variety and the selection of susceptible inbred lines for use in the crossing of other lines preparatory to testing in the corn borer infestation nursery was left to a committee.

The conference appointed a committee to study a uniform method of designating hybrids in the North Central region. The committee is to work in cooperation with similar committees from the New England and Southern regions. Selection of inbred and uniform regional nurseries for late and semi early crosses was also considered but such crosses are too late for North Dakota conditions.

It is the intention in our corn breeding program in North Dakota to test a few early inbred lines for diplodia and other stalk rot resistance and for aphid resistance. A preliminary study to determine the possibility of crossing some of our early inbred lines with the corn borer susceptible lines being used in corn borer resistant tests in order to have these lines tested in the corn borer infested nurseries in Lafayette or Toledo is being planned. The extent to which these aspects of corn breeding in North Dakota can be gone into will depend upon our ability to secure sufficient help as well as equipment. Better strain developed here will be tested for corn borer resistance in the infested areas in other states.