the kernels of U. S. 13 were only partially utilized. This difference in degree of endosperm utilization was apparently more than enough to make up for the difference in size of kernel. The kernels of U. S. 13 were 20% larger by weight than those of the Navajo corn.

The coleoptile, which normally remains intact until after plumule emergence, did not do this in the case of deeply planted corn. The leaf blades opened under ground, particularly with U. S. 13 seedlings from plantings made a foot deep, as shown in the figure. Blades of Navajo seedlings also opened under ground, but not so far under the surface as in the case of those from U. S. 13.

In moist soil the zone of adventitious root development on young corn plants is normally located only an inch or two below the surface of the soil. This is manifestly not the case when deep planting is practiced. The enlargements on the stems marking the location of the first node (Fig. 1) are between 4 and 5 inches from the surface on Navajo seedlings and between 6½ and 7½ inches below on the U. S. 13 seedlings. - GEORGE H. DUNGAN, professor of crop production, Department of Agronomy, University of Illinois, Urbana, Ill.

PHYSIOLOGIC RACES OF PERONOSPORA MANSURICA ON SOYBEANS

In 1946, 10 pure line varieties of soybeans were found to give different reactions at different times to downy mildew; this suggested that different physiologic races of the fungus, Peronospora mansurica (Naoumoff) Syd., were present.

In order to determine if there were different physiologic races of the downy mildew fungus, nine collections of seeds, encrusted with oospores, were obtained during the winters of 1946-47 and 1947-48 from the following sources: Madison, Wis.; Edgewood, Freiburg, and Urbana, Ill.; Stoneville, Miss.; Sikeston, Mo.; Bella Mina, Ala.; Urbana, Ill. (2nd lot); and Nashville, Tenn. The encrusted seeds were planted in very moist soil in the greenhouse and were allowed to germinate. In order to avoid the danger of a possible mixture, the collections were grown in different greenhouses or at different times. Approximately 20% of the seedlings showed systemic infection. The fungus was induced to sporulate by placing the infected plants in a moist chamber for 24 hours at 65°. Collections of the fungus were propagated on the variety (Illini).

The collections were tested, using several soybeans which were selected on the basis of observations. Each collection of mildew was inoculated at the same time for any one reaction and incubated for 24 hours in a moist chamber. The varietal reactions to the mildew collection were recorded according to the following key:

Severity class | Percentage of leaf surface affected
--- | ---
0 | 0
1 | 1-25
2 | 26-50
3 | 51-75
4 | 76-100
A | Pin-point (0)

The differential reactions of the seven varieties to the nine collections of Peronospora mansurica indicated that there were at least three physiologic races present. All seven varieties are similarly to the first seven collections which were previously. These collections were classified as physiologic race 1. Some of these might have been physiologic race 2, which produced a different reaction and was classified as physiologic race 2. The eighth collection produced a different reaction and was classified as physiologic race 3. The reaction of the three physiologic races on the seven soybean varieties is indicated in Table 1.

Physiologic race 2 differed from race 1 in all varieties which were resistant to race 1, and slightly susceptible to race 2. Physiologic race 3 from race 1 and 2 because Richland produced a different type of lesion, indicating considerably more extensive than race 3; whereas, it was completely susceptible to other two races. The type of lesion produced on Richland was larger than the small fleck-type type of lesion.

Table 1. —The reactions of seven varieties of soybean to nine races of downy mildew.