Black Spot (Alternaria spp.) was observed as trace infections only in the August survey.

Black Mold (Alternaria spp.) developed in profusion on Albugo hypertrophies in late maturing fields in the north and northeast portions of the province. The hypertrophies were then very conspicuous and readily noticed by growers who may have missed them earlier, The development of black mold, following the late August and early September rains, suggests that black spot would increase the areas where it was present in traces earlier, thus increasing seed-borne infections by Alternaria.

Stem Rot (Sclerotinia sclerotiorum) was present in trace amounts in some fields in the Aylsham area, This disease must pass unnoticed in most years as it flares up suddenly in moist seasons, when it can become the most serious disease on rape in the province.

Seed samples from widely scattered points on the Canadian Prairies

obtained in culture: Alternaria spp., Botrytis cinerea, Fusarium acuminatum, F. poae, Mycosphaerella brassicicola, Penicillium spp., Rhizoctonia praticola, R. solani, Rhizopus nigricans and miscellaneous saprophytes,

A suspected mineral deficiency of unknown cause occurred in a crop on a podsol soil north of North Battleford. The leaves were pale yellowish-green with darker green areas near the veins.

SAFFLOWER

LEAF SPOT (Alternaria carthami). A sl, infection was seen on a specimen from the Edmonton, Alta. area (E.J. Hawn).

RUST (Puccinia carthami) was presept in irrigated test plots at Lethbridge, Alta, (E.J.H.).

SOYBEAN

Diseases and Disorders of Soybeans in Ontario in 1959

A, A, Hildebrand

Soybean pathology in southwestern Ontario in 1959 was highlighted by three points of more than usual interest and significance.

(a) the extremely low and variable germination of 1959-harvested seed,
(b) the widespread and frequently locally serious incidence of Phytophthora-incited stalk-and root rot.
(c) the localized high incidence of purple stain of seed.

Of the above phenomena, the first is by far the most important. In fact, the low germinability of 1959 seed is without precedent in Ontario and threatens

both a serious shortage and a high price of soybean seed for 1960 planting.

Low Germinability of 1959 Seed

Reports of low germination of 1959-harvested seed have been received from over the entire soybean-growing area of southwestern Ontario, From the evidence available to date no correlation between germinability on the one hand and variety, location, or date of harvesting on the other, is indicated; nor does phenology yet seem to offer. more than the suggestion of a clue as to the cause of the trouble.

The phenomenon involves more than non-germination of seed; there is also a biotic factor. In many seed lots, a fairly high proportion of seeds germinate but the radicles are soon infested with the mycelia of fungi, some of which appear to be parasitic, Among the latter is a species of Diaporthe. Because of the ready and abundant development of an imperfect stage the species might be D. phaseolorum var. sojae, the organism which causes the pod-and-stem-blight disease of soybeans. For the past 18 years that diseases has never been of economic importance in Ontario, mostly because it appears on plants too late in the season to produce really harmful effects. A possibility given some prominence is that some "quirk" in the weather of the past season was conducive to rendering soybeans susceptible to attack by this fungus early enough in the season to be of unusual significance, Such a "quirk" may have been the unusually hot, humid weather that persisted in southwestern Ontario from about August 5 until September 9. It is surmised also that the continuous high temperatures during that period may have adervsely affected certain growth-promoting substances in the seeds. Neither of the above theories has been verified. 11m

Phytophthora Root and Stalk Rot

The results of a study of this disease by the author, from 1956 until early in 1959, were published in Can, J. Botany, 37: 927-957, 1959, under the title "A root and stalk rot of soybeans caused by Phytophthora megasperma Drechsler var. sojae var. nov." The abstract of that paper is as follows:

> "Since 1954, a destructive root and stalk rot of soybeans, identical with one reported from several of the soybean-growing areas in the United States, has been prevalent in southwestern Ontario, It is proposed that Phytophthora megasperma Drechsler var. sojae replace P. cactorum (Lib. and Cohn) Schroet., and P. sojae Kaufman and Cerdemann, as the more correct taxonomic designation of the casual fungus. P. megasperma var. sojae comprises strains, which though indistinguishable morphologically, differ physiologically and pathologically. Artificial inoculation of varieties and of breeding lines and selections of soybeans with the causal fungus, chiefly by the highly reliable toothpick method, indicated two well-defined types of disease reaction, resistance and susceptibility, Harosoy, the variety which currently is grown most extensively in Ontario is highly susceptible to the disease, Pathogenicity trials involving many possible wild and cultivated

hosts emphasized the marked specificity of P. megasperma var. sojae to Clycene max (L.) Merrill. The soybean Phytophthora, having been called P. cactorum and thereby associated nomenclaturally with a representative of that species causing a root rot of sweet clover in Ontario, was found to be quite different from the sweet clover pathogen"

Since the above results were published, some additional observations have beeh made relative to the incidence and severity of the disease, During the 1958-59 winter season, a considerable acreage of the wheat which had been planted in the autumn of 1958 and had made its ushal late-season growth, was covered with ice for several weeks, As a result, much of it was so badly damaged that it was disced under in the spring. In mosl: of such instances, soybeans were planted to replace the wheat. Almost invariably the incidence of Phytophthora root and stalk rot was much more severe in the disced-down wheat fields than in other fields of soybeans in which the pre-seeding practice had been different. The reason for this is thought to be as follows.

When the wheat was disced under, only a few inches of the soil were loosened and aerated, Beneath this was left, undisturbed, a non-aerated, wet compact soil, on/or shallowly within which; the soybeans were planted. Such an environment would seem ideal for the development and multiplication a species of Phytophthora. The possibility that the degradation of the wheat residue in the soil might have been a factor contributing to the increased severity of the disease was at first considered but was rejected after the obtaining of further evidence supporting the soil-compactness theory. In soils where wheat had not been disced down, the disease was often worse on the headlands where the soil had been compacted by the turning of the tractor and other implements. In some cases where a farmer, early in the season, had driven an implement across a soybean field, the pattern of the disease followed the wheel ti-acks, Such was the evidence on which the correlation between severity of the disease and compactness of the soil was made,

Purple Stain of Seed

More soybeans were harvested under adverse weather conditions in 1959 than in many years previously. When harvesting operations should have been at their maximum, there was a succession of rainy periods with only short intervals suitable for harvesting. Always, under such conditions, there is higher incidence of purple stain of seed caused by Cercospora kikuchii. This year the occurrence of purple stain created a problem both for growers and seed dealers. In many instances the latter rdfused to accept seed lots because of the unusually high incidence of purple staid, which in one case 'exceeded 20 per cent.