OPHIOBOLUS SP., A POSSIBLE AGENT OF SUNFLOWER WILT

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Abstract

Studies of sunflower wilt in Yugoslavia have indicated the following fungi as the most frequent agents of the disease: Sclerotium bataticola, Verticillium, and Fusarium spp.

However, brownish-black spots appear on the basal part of the stem of some plants. They frequently form a ring around the stem causing wilting of the infected plants.

In spring, pear-shaped corpuscles - perithecia of Ophiobolus type develop within the spots.

Introduction

There is no mention in recent literature of any fungus from Ophiobolus genus parasitising on sunflowers. However, Seymour (1929) mentions two fungi, Ophiobolus flugidus (C. & P.) Sacc. and Ophiobolus porphyrogenus (Tode ex. Fr.) Sacc. in his publication "Host Index of the Fungi of North America". Since that time there have been no reports about it. Last five years, however, perithecia of Ophiobolus sp. were regularly found on overwintered harvest residues of sunflowers. A report about it was presented at the 5th FAO Sunflower Conference held from July 24 to 27, 1984 in Novi Sad, Yugoslavia (Aćimović, 1984).

Material and Method

Root and stem residues were collected in an experimental plot in which sunflowers were grown for several years and put aside to overwinter. Some of the collected samples were basal parts of the stem covered with brownish-black spots. The samples were inspected by naked eye and microscope at 30-day intervals in fall and winter and at 15-day intervals in spring.

Results

No visible changes could be observed in fall. In the course of spring, and in early June, clusters of black corpuscles were

found on the roots and under the epithelium of the basal parts of the stem. Those were perithecia which finished their forming in late June and early July. Their tips grew through the epithelium protruding from it in the form of black thorns. Beneath the epithelium, the ligneous part of the stem acquired violet color. That color is a reliable sign for identification of the development of Ophiobolus perithecia. Besides perithecia, there developed asci and ascospores as reproductive organs of the fungus. We shall give their short descriptions.

The perithecia are pear-shaped and visible by naked eye (Figure 1). They develop in clusters on the infected part of the stem. Their length is 291-408 micra, 345 on the average, and the width is 215--318 micra, 281 on the average.

Fig. 1 - Ophiobolus sp. Black corpuscles - perithecia on overwintered basal part of the stem and root

The ascus. Several asci are formed in each perithecium. They are crescent-shaped and hyaline. Their length is 61-271 micra, 160 on the average, and the width is 4-6 micra, 5 on the average.

The ascospore. Each mature ascus contains eight ascospores. They are long, thread-like, many-celled, and hyaline (Fig. 2). Their length is 28-176 micra, 88 on the average, and the width is 2-3 micra, 2 on the average.

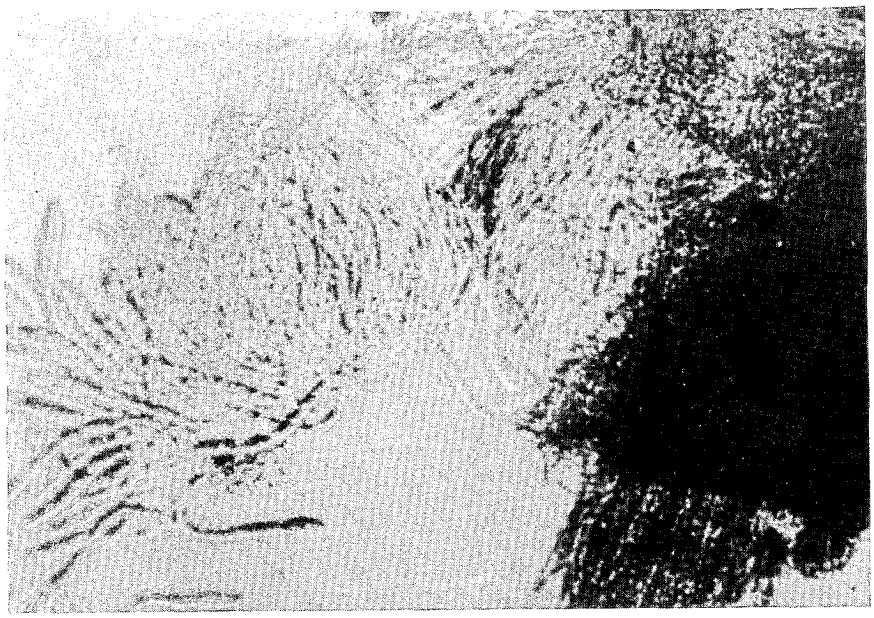

Fig. 2 - Ophiobolus sp. Mature perithecia with loose asci

Discussion

Perithecia of Ophiobolus sp. were regularly found on overwintered harvest residues of sunflower plants infected by wilt. The literature does not mention that fungus as an agent of sunflower wilt. We cannot state with certainty that Ophiobolus sp. is an agent of wilt since we did not study its pathogenicity. Still, the fungus should rather be defined as a parasite and not as a saprophyte because we kept finding reproductive organs of the fungus on wilted sunflower plants. Further studies will provide a reliable answer.

No matter if a parasite or a saprophyte, the fungus deserves attention because it is steadily present on sunflowers.

Conclusion

Studies of sunflower wilt in Yugoslavia have indicated Sclerotium bataticola, Verticillium, and Fusarium spp. as the most frequent agents of the disease.

Some wilted plants, however, were not attacked by fungi from the abovementioned genera. These plants had brownish-black spots on the basal of the stem. The spots frequently formed a ring around the stem causing wilting of the infected plants.

In spring, Ophiobolus perithecia can be found in these spots on overwintered root and stem residues of wilted sunflowers.

The size of the perithecia is (291-408 x 215-318) (345-281) micra, of the asci (61-271 x 4-6) (160-5) micra, and of the ascospores (28-176 x 2-3) (88-2) micra.

References

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