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UNUSUAL SYMPTOM OF DOWNY MILDEW  
OF SUNFLOWER /*Plasmopara*  
*HALSTEDII*/ IN HUNGARY

Downy mildew of sunflower /*Plasmopara halstedii* /Farl./ Berl. et Toni/ occurred for the first time in Hungary in 1954. During the past two decades this pathogen has become one of the most frequent and economically most important ones in this country. Depending on the climatic conditions of the given year significant yield losses were due to the disease.

Appearance of the disease in the field is well known. Two main types of symptom were distinguished: "Type A": systemic infection due to seed-borne inoculum or to early infection of the growing point resulting in typically stunted, distorted, dwarf plants, and "Type B": secondary infection due to air-borne inoculum resulting in more or less angular leaf spots. Under favourable climatic conditions in both cases the fungus sporulates heavily on the infected plant parts. Most recently Cohen and Sackston have reported a latent type of infection of *Plasmopara halstedii*, when no sporulation can be found on the infected plant parts. Such plants, however, yield infected seeds.

During the rainy summer of 1975 a most unusual symptom developed on sunflowers in different parts of the country, which is designated as the "Type C" infection. Inflorescences stopped growing and developing further at a comparatively early stage of flowering. Floral parts became abnormally distorted probably due to disturbed auxin metabolism. Inflorescences became moss-green. Seed coats were also greenish, probably due to the presence of chlorophyll. Internal tissues

of the diseased heads turned more or less brown. No leaf or stem symptoms or stunting of plants were observed.

This phenomenon occurred on almost all the cultivated varieties. In certain commercial fields as many as 56% of the plants had this symptom, and as a consequence of this the same magnitude of yield loss occurred. Further economic disadvantages of the "Type C" disease involved difficult mechanical harvesting and an increased seedfall during the harvest.

Appearance of the "Type C" symptoms seem to be connected with the unusual meteorological conditions of the summer of 1975. In Table 1. the main climatic factors of the critical period /May, June and July/ of an average year /1973/ and the same data of 1975 are compared. The summer of 1975 was marked by extraordinarily high humidity and high amount of precipitation. In May 1973 there was no precipitation; the number of rainy days during May, June and July was 21, and the total precipitation during the three months was 188.9 mm. In contrast of this, in 1975 the rainfall from May to July was 298.25 mm. In addition RH was higher in 1975 than in other years, with 100% relative humidity at night. So, the appearance of "Type C" symptoms is clearly dependent on the climatic factors during the early flowering time.

Microtome sections made from tissues of diseased /"Type C" symptom/ sunflower heads have revealed presence of hyphae, haustoria and oospores of *Plasmopara halstedii*.

Significant differences were observed between the susceptibility of various varieties, hybrids and inbred lines. Data of occurrence of *Plasmopara* "Type A", "Type B" and "Type C" symptoms in a variety comparison field tests carried out in 1975 are summarized in Table 2.

Table 1

## Main Meteorological Data in 1973 and 1975

	Average temperature	Temperature Co		Relative humidity, %	Number of rainy days	Total amount of rain
		Maximum	Minimum			
1973						
May	18.5	20.3	12.3	57	-	-
June	19.6	21.2	14.8	70	11	106.2
July	22.1	24.2	17.3	69	10	82.7
1975						
May	18.6	20.7	13.3	71	14	88.6
June	18.9	21.1	14.2	72.6	15	64.1
July	22.1	24.3	17.4	74.7	10	145.6

Table 2  
 Plasmopara Infection /"A", "B" and "C" Types and Total/ in  
 a Variety Test in 1975

Variety	Plasmopara infection, %				Total
	"Type A"	"Type B"	"Type C"	Total	
VNIMK 6540	5.0	10.0	13.0	28.0	
Peredovik	1.7	0	11.1	12.8	
R H.S 50 CRM	0	0	0	0	
R H.S 52	0	1.8	5.4	7.2	
R H.S 53	0	1.6	8.2	9.8	
R H.S 59	0	5.5	12.7	18.2	
R H.S 80	0	3.0	0	3.0	
R H.S 82 CRM	0	0	0	0	

## References

1. Podhradszky J. 1954: A napraforgó új betegsége, a napraforgó-peronoszpóra /Plasmopara halstedii /Farl./ Berl. et de Toni/ Magyarországon. - Növénytermelés. 3: 129-134.
2. Cohen, Y. and Sackston, W.E. 1974: Seed infection and latent infection of sunflowers by *Plasmopara halstedii*. - Can. J. Bot. 52: 231-238.