

Factors effecting of the environment and the climatic condition
to the parasitation of the *Sclerotinia sclerotiorum* (Lib.) de
Bary on sunflower.

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S U M M A R Y

The ecological factors have been studied to reveal the effect of the conditions of soil to the development of apothecia of *Sclerotinia sclerotiorum*. The different genotypes of the soils determined the sporogenesis. The most of apothecia were developed on the surface of soddy alluvial and the sandy soils. Strong correlation have been found between the physical, chemical and microbiological features of the soil and the intensity of apothecia development. The susceptibility of sunflower were studied on the field. NS-H-45, NS-H-43, S-2151 and U 55E, S-281, U 74 E were tolerant to *Sclerotinia sclerotiorum* by spontaneous infection and under provocation on the field.

I N T R O D U C T I O N

The *Sclerotinia sclerotiorum* has lots of host plants. In such a case enormous vegetativ schisms accumulate in the soil. In order to work out sufficient control method against the disease. It becomes absolutely essential to know more about the biology of the fungus and to reveal the most important epidemic factors (1, 2, 3.). As it is known, *Sclerotinia sclerotiorum* overwinters by means of sclerotia and it is able to infect the host plants in two ways. Either by vegetativ mycelia in the soil, or by the generativ ascospores above the ground. In favourable conditions apothecia are formed from the sclerotia on the open surface of apothecia large number of asci develops, each contains eight ascospores. As a consequence of the change of environmental factors, ascospores are getting in the air spurtting wich is the results of the contraction and expansion of the apothecia. In sufficient humidity ascospores germinate and germ tubes penetrate into the host tissues wich will be desintegrated by

pectinase and cellulase enzymes, produced by the pathogen (4, 5, 6, 7). Earlier an artificial inoculation method - similar to the natural infection - have been worked out. Artificial inoculation of various plants revealed, that *Sclerotinia sclerotiorum* can infect young branches of locust-tree and swingle too (3). This paper aims to reveal-what kind of environment and climatic conditions help the development of apothecia and its sporulation on the field, on the other hand we would like to give some information about the epidemic potential of different sunflower hybrids.

MATERIAL and METHOD

The experiments were carry out the Research Centre of Seed Production and Trading Company in Nyiregyháza. The observations were take out continuity from 1985 to 1990. The sclerotia of *Sclerotinia sclerotiorum* were frozen in perlite or in composted soil at minus 15-20 ° C for 3-4 weeks, under diffuse light and 80-90 % relativ humidity. After this treatment apothecia developed throughout 3-4 weeks. After the appearence of the apothecia ocured for 1-3 days. Discharged ascospores were collected by suitable spore traps and they were used for artificial inoculation. *Trichoderma* ssp. content was tested from different genotypes of the soils by Martin medium. We studied the concentration and the species of population of hyperparasita organism. We determined the physical, chemical feature of the soils (table 1,2). Early maturity and middle-maturity sunflower hybrids were tested by *Sclerotinia sclerotiorum* under provocation in the field (table 3,4)

Table 1. Tested soils

No.	genotypes of the soils	origin	date of examinations
1.	soddy alluvial	Rakamaz	1986, 1987, 1988, 1989
2.	meadow soil	Tiszavasvári	1986, 1987, 1988, 1989
3.	forest earth	Mátészalka	- 1987, 1988, 1989
4.	sandy soil	Nyiregyháza	- 1987, 1988, 1989
5.	peaty soil	Tyukod	1986, 1987, - 1989
6.	common chernozen	Nagycsérkesz	- 1987, 1988, 1989

RESULTS

The most suitable climatic condition parameters were the following for the sporogenesis of *Sclerotinia sclerotiorum*:

temperature of the air: 20 - 25 °C
temperature of the soil: 15 - 18 °C
relative humidity : 80 - 90 %
wetness of the soil : min 30 %
intensity of the light : min 1500 max 6000 Lux

Under such a conditions of environment could be found the most intensiv sporogenesis of white mould on the surface of soddy alluvial and sandy soils. The concentration of apothecia was less on the surface of the forest earth, meadow and peaty soils (table 2.).

We gave negativ correlation between *Trichoderma* ssp. concentration $\text{NO}_3\text{-N}$, $\text{NH}_4\text{-N}$ mg/100 g. soil content, humus content and numbers of apothecia of *Sclerotinia sclerotiorum*. (table 2.).

Different genotypes of sunflower hybrids were examined in the field under provocation. The basal stem, stem and head rot value and average of susceptible showed the field tolerance of sunflower (table 3,4.).

DISCUSSION

We have got new informations from the epidemic of *Sclerotinia sclerotiorum* (Lib.) de Bary. The climatic conditions (temperature, wetness, light) and the different genotypes of the soils and the susceptibility of sunflower hybrids have an important roll in development of epidemic of white mould on sunflower in Hungary. There is a strong correlation between organic matter of the soils and the number of apothecia on the surface. The susceptibility of sunflower is an important character for plantproduction. The early maturity U 55 E, S - 281, U 74 E, the middle-maturity NS-H-45, NS-H-43, S-2151 were less susceptible on the field under the provocation circumstances.

Table 2.

Influence of physical, chemical and microbiological parameters
for sporogenesis of *Sclerotinia sclerotiorum* on different
genotypes of soils.

type of the soils	soddy alluvial	sandy soil	chernozem common	forest earth	meadow soil	peaty soil
No. of Sc.sc.	139	93	68	56	46	39
No. of Tricho- derma ssp.	46	35	22	20	21	112
pH H ₂ O absorb.	6,7	7,4	7,6	7,4	5,7	6,5
P ₂ O ₅ mg/100 g. absorb.	27	9,2	21	8,1	21	14
K ₂ O mg/100 g	6,1	21,5	39,5	15	15,2	21,5
NO ₃ -N mg/100 g	0,31	0,33	0,53	0,35	3,40	4,44
NH ₄ -N mg/100 g	0,23	0,32	1,28	2,33	3,89	4,75
Ca mg/100 g	70	125	196	280	480	990
Mg "	11	7	23,5	28,7	38,0	49,5
Solubl Zn.	0,3	2,2	2,6	2,5	2,8	1,8
" Fe	33,0	34,5	28,0	21,5	14,0	4,0
" Cu	0,3	0,9	1,1	0,7	0,5	0,3
" Mn	125,0	67,5	42,6	27,0	20,0	11,5
Humus	0,56	1,0	1,15	2,8	3,18	7,8

No. of *Sclerotinia sclerotiorum*

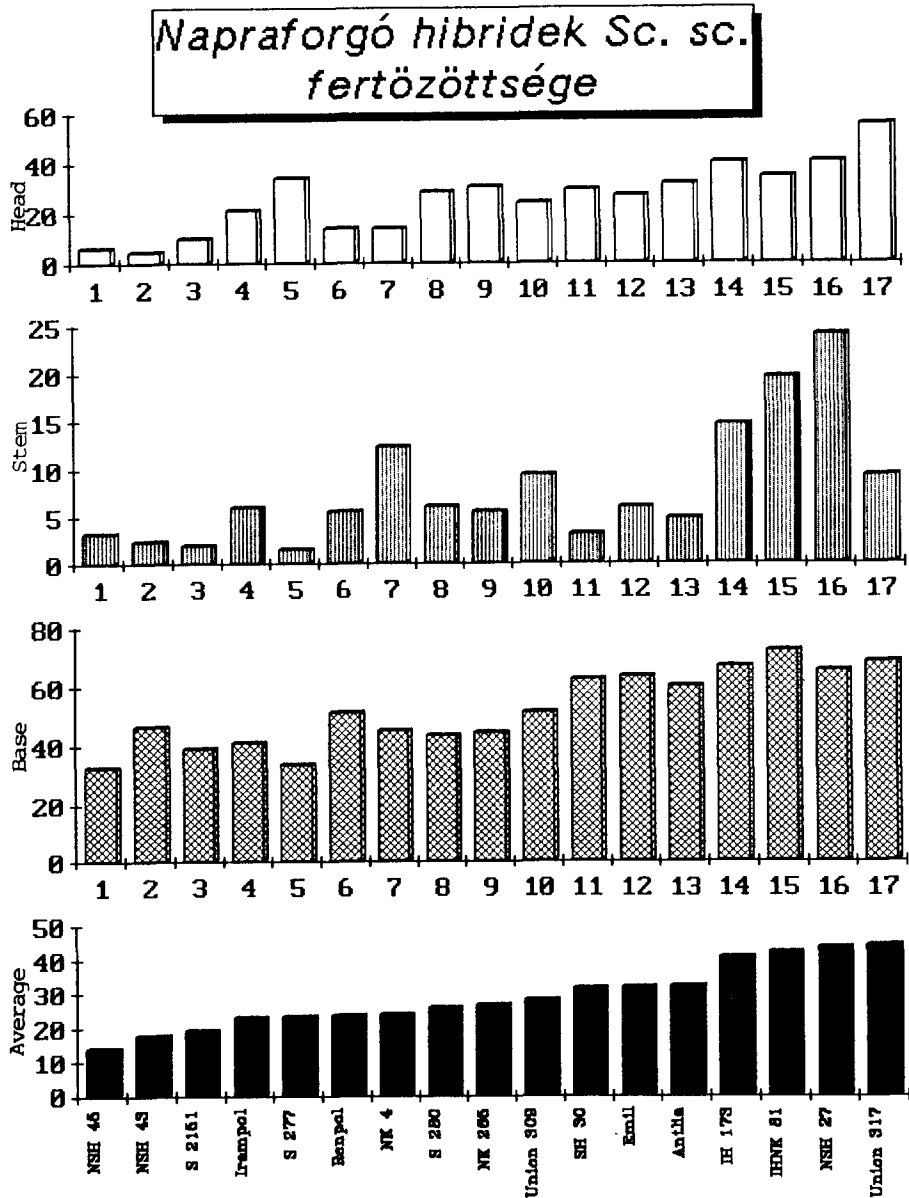
SzD_{5%} : 10,95

SzD_{1%} : 15,14

SzD_{0,1%} : 20,9

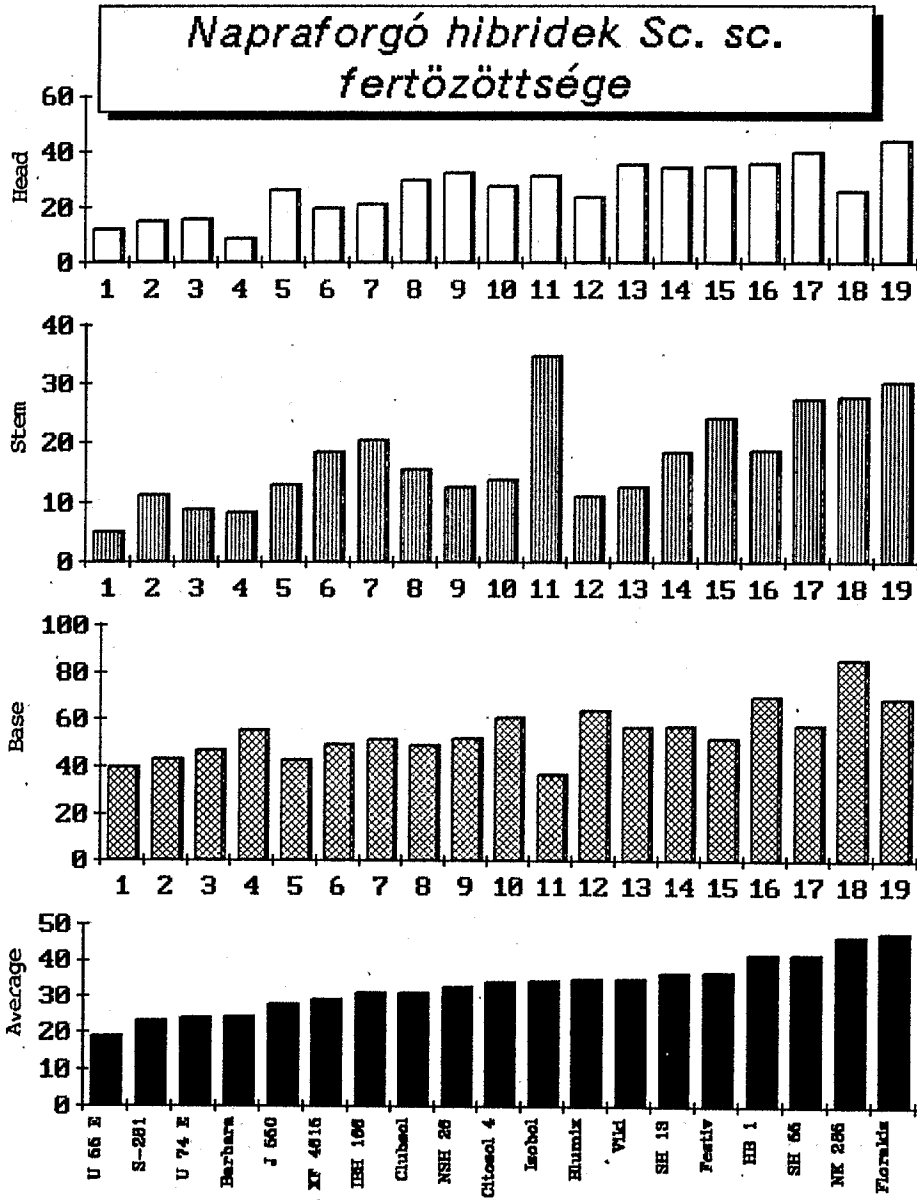
Table 3.

Sc. sc. infection of sunflower hybrids



Sc. sc. infection of sunflower hybrids

Table 4.



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