Table(4)- Effect Of Different Concentrations Of Some Fungicides On Linear Growth (in mm) Of *Sclerotium cepivorum* (Iso. No. II)

Treatments	Concentrations in ppm												
	Control 0.0 ppm	2.5	5	10	25	50	100	200	500	800	1000	2500	Total	Mean
Allisan	86.00	32.00	29.50	29.25	18.25	15.00	3.25	0.00	0.00	0.00	0.00	0.00	213.25	17.77
Rovral	86.00	24.25	22.00	19.00	18.00	12.00	10.75	0.00	0.00	0.00	0.00	0.00	192.00	16.00
Benlate	86.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	86.00	7.17
Ronilan	86.00	7.25	6.50	4.00	2.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	106.25	8.85
Sumisclex	86.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	86.00	7.17
Bavistin	86.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	86.00	7.17
Daconil	86.00	86.00	86.00	86.00	86.00	86.00	65.00	29.50	22.50	14.75	9.50	2.00	659.25	54.94
TOTAL	602.00	149.50	144.00	138.25	124.75	113.00	79.00	29.50	22.50	14.75	9.50	2.00	1428.75	
Mean	86.00	21.36	20.57	19.75	17.82	16.14	11.29	4.21	3.21	2.11	1.36	0.29		17.01

	$L.S.D._{0.05}$:	$L.S.D._{0.01}$:
Fungicides (F)	0.81	1.06
Concentrations (C)	1.06	1.39
F x C	2.79	3.69

Data in Table (5) indicated that all tested fungicides increased percentage of seed germination except Allisan and Rovral at the lowest rates (10, 20 g/kg) as compared with control. This may be attributed to the toxic effect of the two fungicides. Generally, the percentage of germinated seeds increased by increasing the rate of the fungicides. Also, results showed that the fungus did not affect the percentage of seed germination. These results are in accordance with previous studies by Mousa (1982) and Mesha (1985) who found that soybean seed treatment with fungicides increased percentage of seed germination except Rhizoctal and Benlate-50 which caused a significant reduction in seed germination.

Also, effect of seed treatment with fungicides on percentage of white rot disease was studied under artificial soil using the highly virulent isolate(No. II). Data in Table (5) show that all tested fungicides improved percentage of healthy seedlings as compared with the untreated seed (control). All tested fungicides increased the percentage of healthy seedlings by increasing the rate of application except Benlate and Sumisclex which gave 55.29, 92.30, 70.59 and 83.75 % with Benlate in soil infested by S. cepivorum at the rates of 1, 2, 4 and 8 g/kg seed respectively, 5, 10, 15 and 20 g Sumisclex/kg seed gave 66.67, 73.53, 97.44 and 94.12 % healthy seedlings respectively. S. cepivorum reduced the percentage of healthy seedlings with all tested fungicides but the reduction was very clearly with

Table (5) - Effect of Different Rates of Some Fungicides On Percentage of Seed Germination And White Rot Incidence On Giza 6 M Cultivar Seedlings.

Fungicides	Rates g/kg	10 days after sowing % of germinated seeds		60 days after sowing % of healthy seedlings	
		Infested	Non-infested	Infested	Non-infested
Allisan	10.00	75.00	77.50	38.96	100.00
	20.00	77.50	80.00	42.68	100.00
	50.00	77.50	77.50	56.25	100.00
	100.00	80.00	80.00	60.98	100.00
Rovral	10.00	82.00	80.00	68.75	100.00
	20.00	82.00	80.00	67.07	100.00
	50.00	85.00	85.00	68.97	100.00
	100.00	92.50	95.00	68.42	100.00
Benlate	1.00	80.00	80.00	55.29	100.00
	2.00	95.00	90.00	92.39	100.00
	4.00	80.00	85.00	70.59	100.00
	8.00	80.00	80.00	83.75	100.00
Ronilan	5.00	82.50	82.50	57.32	100.00
	10.00	85.00	85.00	64.71	100.00
	15.00	87.50	87.00	73.33	100.00
	20.00	87.50	87.50	71.05	100.00
Sumisclex	5.00	85.00	85.00	66.67	100.00
	10.00	82.50	82.50	73.53	100.00
	15.00	97.50	97.50	97.44	100.00
	20.00	87.50	85.00	94.12	100.00
Control		82.50	82.50	44.85	100.00

L.S.D. 0.05 :	10 days	60 days
Fungicides (F)	2.16	2.36
Concentrations (C)	2.16	2.36
Infection (I)	N.S	1.49
F x C	4.82	5.28
F X I		3.34
C X I		3.34
F X C X I		7.47

control (infested with fungus and without fungicides). Generally, Sumisclex and Benlate were the most superior fungicides as compared to the other tested fungicides and control. Also, the highest percentage of healthy seedlings was obtained with 15 g Sumisclex/kg seed followed by 2 g Benlate/kg seed. On the other hand, the lowest percentage of healthy seedlings was obtained with 10g Allisan/kg seed. These results are in agreement to some extent with those obtained by Fletcher *et al*. (1972), Krause and Kalchschmid (1977), Chiba *et al*. (1980) and Entwistle and Munsinghe (1980).

b) Effect of Different Rates of Some Fungicides on White Rot Percentage at Four Periods of Growth Season Under Greenhouse Conditions:

The effect of different rates of some fungicides on the control of white rot disease was studied during growth season under greenhouse conditions. The treatments were applied as seedling dip method . In general results in Table (6) showed that all tested fungicides significantly decreased the percentage of infection with white rot disease at different periods of growth of onion seedlings. The lowest percentage of onion white rot was obtained with Sumisclex at the rate of 40 g/L. On contrast, the highest percentage of white rot was obtained with Allisan 100 g/L. Also, results indicate that Sumisclex was the most effective fungicide for

Table (6) - Effect Of Different Rates of Some Fungicides As Seedling Dip Method On White Rot Disease Incidence At Four Periods During Growth Season Under Greenhouse Conditions.

Fungicides	Rate	30 days	60 days	90 days	120 days
Allisan	100 g/L	35.00	40.00	40.00	40.00
	200 g/L	25.00	25.00	30.00	25.00
	300 g/L	25.00	25.00	25.00	30.00
Rovral	25g/ L	20.00	25.00	30.00	35.00
	50 g/L	20.00	20.00	20.00	25.00
	75 g/L	5.00	25.00	25.00	30.00
Benlate	1.5 g/L	20.00	30.00	35.00	40.00
	3.0 g/L	20.00	30.00	30.00	30.00
	4.5 g/L	5.00	20.00	20.00	20.00
Ronilan	10 g/L	20.00	20.00	20.00	30.00
	20 g/L	15.00	15.00	15.00	20.00
	30 g/L	10.00	15.00	15.00	25.00
Sumisclex	20 g/L	5.00	5.00	10.00	10.00
	40 g/L	0.00	5.00	5.00	5.00
	60 g/L	0.00	5.00	5.00	5.00
Control		30.00	45.00	65.00	65.00

Periods: Days after transplanting

L.S.D. 0.05 :

Concentration (C)	1.45
Fungicides (F)	1.63
Periods (P)	1.45
CxF	3.25
CxP	2.64
FxP	3.25
CxFxP	6.51

the control of white rot disease of onion followed by Ronilan Benlate and Rovral fungicides. Meanwhile, Allisan was the lowest effective in this respect. These results are in harmony with those obtained by Sirry et al. (1974), Ali et al. (1977), Entwistle and Munasinghe (1980) and El-Said et al., (1982) who stated that seedling dipping with Allisan and Terraclor at 30 gm/100 cc water prevented occurance of white rot disease during 1978, 1979 and 1980 seasons. Benlate, Bavistin and Topsin were more effective as seedling dipping used at 3 g/100 cc water than as soil treatment at 10 kgs/ feddan.

V. Biological Control

A. In Vitro

1. Antagonism Between The Rhizosphere Isolated Microflora and *S. cepivorum* (the Causal Organism of White Rot Disease):

Antagonism between the rhizosphere isolated microflora (bacteria, fungi and actinomycetes) from the rhizosphere of Giza 6 M onion plants and *S. cepivorum* the causal organism of white rot disease was studied.

Results in Table (7) showed that *S. cepivorum* had different effects on the radical growth of the isolated rhizosphere organisms as follows :

Table(7)- Antagonism between The Rhizosphere Isolated Microflora And *S. cepivorum* The Causal Organism of White Rot Disease (Iso. No. II)

Rhizosphere isolated microflora	Treatments * Inhibition zone (mm.) A	B	C
Streptomyces sp. (Iso. No. 24)	1.1	2.3	1.6
Streptomyces sp. (Iso. No. 23)	3.50	4.10	6.00
Bacillus subtilis	3.20	5.50	4.20
Trichoderma sp. (Iso. No. 21)	0.00	4.00	-
Trichoderma sp. (Iso. No. 20)	0.00	3.00	-
Trichoderma sp. (Iso. No. 19)	0.00	4.00	-
Trichoderma sp. (Iso. No. 18)	0.00	0.00	-
Trichoderma viride	0.00	4.00	-
Trichoderma harzianum	0.00	6.00	-
Penicillium sp. (Iso. No. 15)	1.50	1.20	2.50
Penicillium sp. (Iso. No. 14)	2.43	3.00	4.20
Penicillium sp. (Iso. No. 13)	0.00	2.00	10.00
Penicillium sp. (Iso. No. 12)	4.17	0.90	1.80
Myrothecium sp.	8.17	2.92	3.90
Helminthosporium sp. (Iso. No. 10)	9.00	2.30	4.10
Helminthosporium sp. (Iso. No. 9)	0.00	2.00	6.00
Gliocladium sp.	2.00	2.00	1.75
Fusarium sp. (Iso. No. 7)	4.88	2.00	2.50
Fusarium sp. (Iso. No. 6)	2.14	3.25	3.80
Drechslera sp.	1.10	3.00	5.00
Bipolaris sp.	1.30	3.00	2.63
Aspergillus sp. (Iso. No. 3)	1.30	1.10	1.20
Aspergillus sp. (Iso. No. 2)	8.00	7.10	3.40
Alternaria sp.	1.71	1.00	1.30

* Antagonism between A : the antagonist and the pathogen at the same time.
B : the antagonist was inoculated 48 hr after the pathogen.
C : the antagonist was inoculated 48 hr before the pathogen.

phere organisms as follows:

When the antagonist and the pathogen inoculated at the same time, it is clear that the highest inhibition zone (9.00) was obtained with Helminthosporium sp. (Iso. No. 10) followed by Myrothecium sp. (8.17) and Aspergillus sp. (8.00) (Iso. No.2). Inhibition zone was not obtained with all Trichoderma isolates and Penicillium sp. (Iso. No. 13) and Helminthosporium sp. (Iso. No. 9).

When the antagonist was inoculated 48 hours after the pathogen, the biggest inhibition zone was obtained with Aspergillus sp. (Iso. No. 2) followed by Trichoderma harzianum and Bacillus subtilis. On the other hand, the inhibition zone has not been found between Trichoderma sp. (Iso. No. 18) and the pathogen.

Also, it is clear from the same Table that the biggest inhibition zone between the antagonist and the pathogen was found with Penicillium sp. (Iso. No. 13), Helminthosporium sp. (Iso. No. 9) and Streptomyces sp. (Iso. No. 23), when the antagonist was inoculated 48 hours before the pathogen. All Trichoderma isolates grow and over covering the pathogen and inhibited it completely. These results are in agreement with those obtained by Georgy (1977) who mentioned that Penicillium citrinum, Fusarium solani, Penicillium cyclopium and Aspergillus terreus induced highest values of inhibition to S. cepivorum respectively. The highest antagonistic bacteria to S. cepivorum were Bacillus subtilis, B. licheniformis and B. cereus. Also results are in harmony with Abdel-Moity (1985) who found that on screening in Vitro, for antagonism to S. cepivorum, Paecilomyces lilacinus and a Penicillium sp. caused an inhibition halo although hyphal contact never occurred. T. harzianum showed inhibitory activity at a distance and after contact with S. cepivorum caused disintegration of the hyphal cotyplasm and cell wall collapse. This detrimental effect occurred either after direct penetration of the cell wall or after coil formation.

2. Saprophytic Behaviour of the Pathogen S. cepivorum:

a) Interaction on Agar Plates:

The types of interaction of two fungi at a standard distance on PDA plates were studied. The twenty four micro-organisms Table (8) which were isolated from rhizosphere region of Giza 6 M onion plants except for Trichoderma harzianum, Trichoderma viride and Bacillus subtilis were allowed to interact with S. cepivorum, the causal organism of white rot disease on PDA plates for 7 days except for Trichoderma isolates (only 3 days) at 20°C. The types of interaction were classified as suggested by Sabet and Khan (1969b) as follows: MI, CCC, SI, GS-LNI, GS-LI and GACO. Types of interaction were observed as shown in

Table(8)- Interaction On Agar Plates Between Some Antagonists (Isolates) And The Pathogen

S. cepivorum (Iso. No. II)

Antagonist	Reaction *
Alternaria sp.	SI
Aspergillus sp.	MI
(Iso. No. 2)	CCC
Aspergillus sp.	SI
(Iso. No. 3)	
Bipotaris sp.	MI
Drechslera sp.	MI
Fusarium sp.	SI
(Isol. No. 6)	
Fusarium sp.	SI
(Iso. No. 7)	
Gliocladium sp.	SI
Helminthosporium sp.	MI
(Iso. No. 9)	
Helminthosporium sp.	GS,LNI
(Iso. No. 10)	
Myrothecium sp.	MI
Penicillium sp.	MI
(Iso. No. 12)	
Penicillium sp.	GS,LNI
(Iso. No. 13)	
Penicillium sp.	GS,LNI
(Iso. No. 14)	
Penicillium sp.	GS, LNI
(Iso. No. 15)	
Trichoderma harzianum	GS, LI GACO
Trichoderma viride	GS, LI GACO
Trichoderma sp.	GS, LI
(Iso. No. 18)	GACO
Trichoderma sp.	GS, LI
(Iso. No. 19)	GACO
Trichoderma sp.	GS, LI
(Iso. No. 20)	
Trichoderma sp.	MI
(Iso. No. 21)	
Bacillus subtilis	MI
Streptomyces sp.	MI
(Iso. No. 23)	CCC
Streptomyces sp.	SI
(Iso.No. 24)	

* Types of interaction of two fungi as suggested by Sabet and Khan, 1969b. :

1) Slight inhibition, both organisms were inhibited but approached each other until they were almost in contact (SI).
2) Mutual inhibition at a considerable distance (MI).
3) Colony character of the interacting organisms changed at the margins (CCC).
4) Growth superficial over the contending organism, when underlying organism was not inhibited (GS,LNI).
5) Growth superficial over the contending organism, when underlying organism was inhibited.
6) Growth around the contending organism.

Table (8). Generally results obtained indicate that *Trichoderma* sp. (Iso. No. 18), *Trichoderma* sp. (Iso. No. 19), *Trichoderma* sp. (Iso. No. 20), *T. harzianum* and *T. viride* were antagonistic to *S. cepivorum*.

b) Competitive Saprophytic Ability (CSA):

The competitive saprophytic ability of *S. cepivorum* was studied using the agar plate method. Colonization ratings were recorded, seven days after incubation at 20°C.

Results obtained in Table (9) show that colonization ratings recorded for the tested fungus generally increased with increasing the amount of inoculant in inoculum-soil mixture. On the other hand, colonization ratings decreased when the inoculum-soil mixtures were allowed to interact for 24 hours before discs were taken. These results are similar to those reported by Garrett (1956), Sabet and Khan (1969a) and Khalil, (Ikbal) *et al*. (1981), who concluded that some species of *Fusarium* and *Pythium* were soil-inhabiting fungi because they have a high CSA. Stover (1958) listed some species of *Verticillium* as soil fungi and little inhabitants, while Abdel-Azim *et al*. (1978) found that *Verticillium* was a poor competitive saprophyte. Also Hilal (1985) studied the CSA of pelargonium pathogenic fungi and indicated that colonization ratings decreased when the inoculum-soil mixtures were allowed to interact for 24 hrs before inoculation on PDA medium.

Table(9)- Competitive saprophytic ability of <u>Sclerotium cepivorum</u>

(Iso. No. II)

Treatments		% inoculum in inoculum-soil mixture										
		0	10	20	30	40	50	60	70	80	90	100
% area occupied by *S. cepivorum*	A	0	0	0	14.9	20.4	22.9	32.4	37.5	39.1	43.0	100
	B	0	0	0	5.2	7.1	9.0	10.8	14.5	17.3	19.6	100

A = Inoculum-soil mixtures were not allowed to interact.

B = Inoculum-soil mixtures were allowed to interact for 24 hours.

B) In Vivo

Effect of a Single or Mixture of Antagonistic Isolate(s) on Percentage of White Rot Disease Under Greenhouse Conditions:

Four isolates of Trichoderma, an isolate of *Streptomyces* isolated from onion plants rhizosphere *T. harzianum* and *T. viride* were used for onion white rot biocontrol.

Results obtained in Table (10) indicated that the lowest percentage of infection with white rot (0.0%) was observed using mixture of *Trichoderma* sp. (Isolate No. 19) and *Streptomyces* sp. (Isolate No. 23) compared with control 2 and other treatments. However, *T. harzianum* and *T. viride* gave the highest percentage of infection with white rot 15.0%, 10.0%, respectively, they were the superior to control. These results are in agreement with those obtained by Katznelson (1965), Abdel-Moity *et al*. (1976), Lewis and Papavizas (1984b) and Oliveira *et al*. (1984) who found that *T. harzianum* reduced the severity of white rot and increased the number of healthy plants when applied as a conidial suspension during transplanting.

Table (10): Effect of a Single Or Mixture of Antagonistic Isolate (S) On Percentage of white Rot Disease Under Green House Conditions.

Antagonists	Infested soil with *S. cepivorum* (Iso. No. II)									
	Trichoderma viride	*Trichoderma* sp. (Isolate No.18)	*Trichoderma* sp. (Isolate No. 19)	*Trichoderma* sp. (Isolate No.20)	*Trichoderma* sp. (Isolate No. 21)	*Trichoderma harzianum*	*Streptomyces* sp. (Isolate No. 23)	Mixture of 19 x 23	Control 1 *	Control 2
Disease severity	10.0	5.0	5.0	15.0	5.0	15.0	5.0	0.0	0.0	50.0

* Control 1 = untreated soil
Control 2 = infested soil without antagonists.

L.S.D. 0.05:

Antagonists 13.43

VI. Chemical Analysis:

A. Total Amino Acids:

Results shown in Table (II) indicate that the total amino acids in healthy plants was very high in Giza 20 (M.S) followed by A. line CV (L.S.) whereas it was very low in (Texas Grano 502 prr (H.S.) Shandawil I and Giza 6 M (M.S) 60 days after transplanting. Total amino acids significantly increased in healthy bulbs of Shandawil I (M.S.) after 90 days of transplanting than the other CVS. The amino acids increased with prolonging the period from 60 to 90 days after transsplanting in both infected and healthy plants of Texas Grano 502 prr (H.S.), Shandawil I -(M.S.) and the apparent healthy bulbs of Giza 6 M (M.S.) only whereas it significantly decreased in the other treated CVS. The total amino acids significantly decreased in healthy and diseased bulbs of all tested CVS compared to that after 90 days except sterile CV which total amino acids showed an increase.

Results are in harmony with those of Shalaby et al. (1987) whereas they are contradicted with those of Awad (1976), El-Shabrawy (1978), Sirry et al. (1979), Radwan (1980) and Khalil (1981).

B) Phenolic Compounds:

Results shown in Table (12) indicate that total phenol content was high in apparent healthy plants of Shandawil

Table (II) - Total amino acids in healthy and infected plants with <u>Sclerotium cepivorum</u> (Iso. No. II) under green house conditions (Calculated as mg/g fresh weight).

Cultivar	Treatment	Percentage of infection Days after transplanting 60	90	120	60 days after transplanting	90 days after transplanting	120 days after transplanting
Texas Grano	Infected	22.22	22.22	11.11	22.542	53.681	7.583
502 prr	Healthy	0.0	0.0	0.0	14.500	54.492	21.111
Giza 6 M	Infected	33.33	11.11	0.0	74.710	73.343	13.631
	Healthy	0.0	0.0	0.0	26.458	41.658	35.832
Giza 20	Infected	22.22	11.11	0.0	95.068	43.659	11.667
	Healthy	0.0	0.0	0.0	145.718	48.266	45.578
Shandawil I	Infected	11.11	22.22	22.22	67.007	291.619	179.313
	Healthy	0.0	0.0	0.0	25.000	375.400	186.378
American line	Infected	0.0	0.0	0.0	25.412	20.900	29.306
(sterile)	Healthy	0.0	0.0	0.0	111.658	64.789	84.353

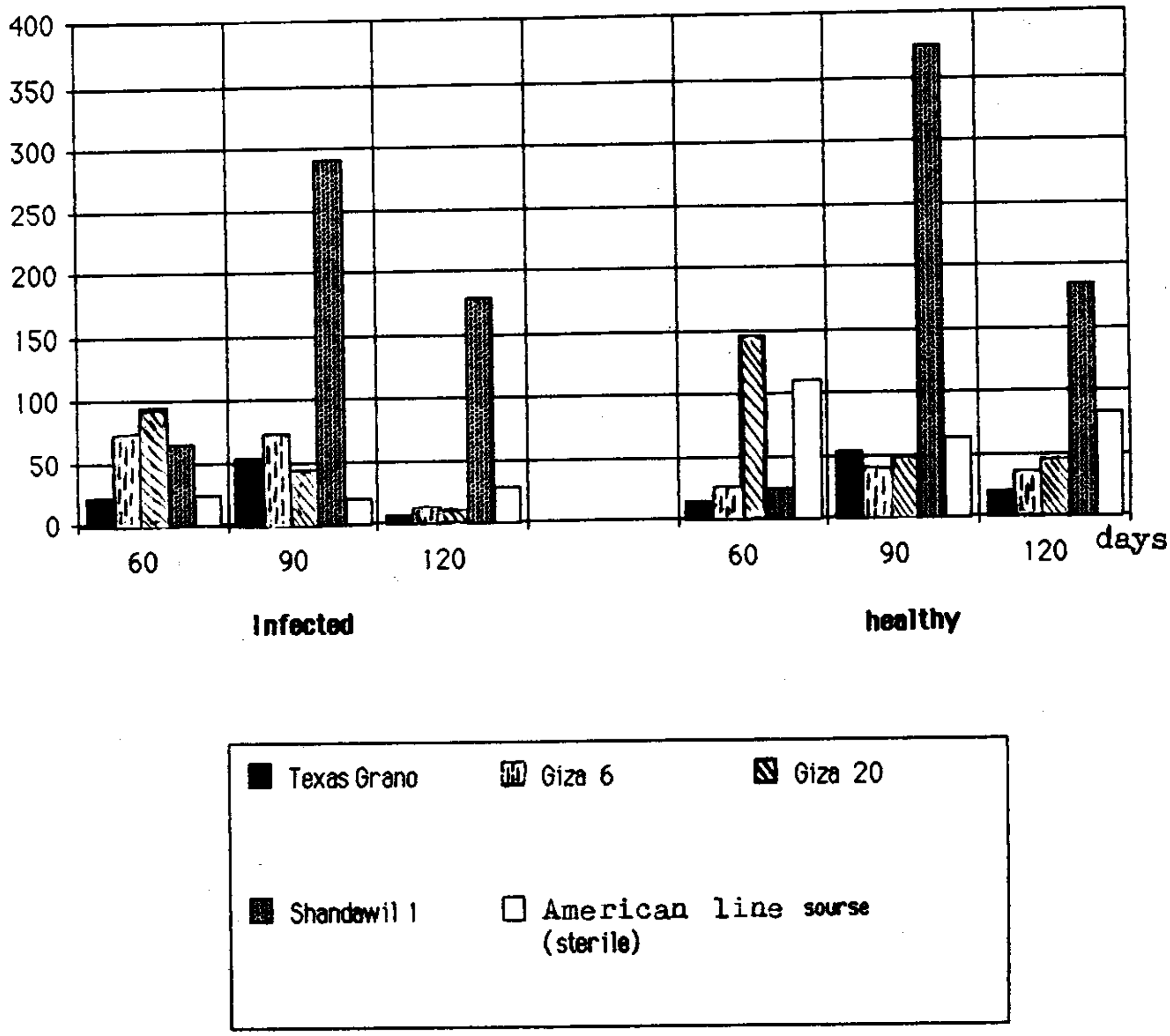

Fig. 1 **Total amino acids in healthy and infected plants with *sclerotium capivorum* under green house conditions**

I (M.S.) followed by A. line sterile (L.S.), moderate in Texas Grano 502 prr (H.S.) and low in Giza 20 and Giza 6 M (M.S.) respectively 60 days after transplanting. In general the total phenol content increased after 90 days of transplanting in all tested CVS whereas it decreased in all tested CVS (except Giza 6 M) after 120 days of transplanting.

The total phenol content of CVS infected bulbs, increased than that of the healthy bulbs aftér 60 days of transplanting but it showed a reverse trend in Shandawil I (M.S.) and American line source sterile (L.S.). The infected bulbs of the five tested CVS showed an increase in their phenol content after 90 days than the apparent healthy plants except in Texas Grano (H.S.) which showed a reduction in infected bulbs. The increase was very high in Giza 6 M (M.S.) Giza 20(M.S.) and Shandawil I (M.S.) reaching about ten fold.

The total phenol content in the infected bulbs of the tested CVS increased than that of the healthy ones, 120 days after transplanting except in Shandawil I (M.S.) which decreased. The increase was very high in the sterile CV (L.S.) and Giza 6 M (M.S.) with values of 6.157, 4.186 mg/g fresh weight, respectively.

As for free phenols in apparent healthy plants it was high in the sterile CV (L.S.) followed by Shandawil I (M.S.) whereas it was very low in Giza 6 M (M.S.) after 60

Table (12)- Phenol contents in healthy and infected plants with **Sclerotium cepivorum** (Iso. No. II) under green-house conditions (calculated as mg/g fresh weight).

Cultivar	Treatment	Percentage of infection days after transpl.			Total phenols			Free phenols			Conjugated phenols		
		60	90	120	60 days after * transpl.	90 days after transpl.	120 days after transpl.	60 days after transpl.	90 days after transpl.	120 days after transpl.	60 days after transpl.	90 days after transpl.	120 days after transpl.
Texas Grano	Infected	22.22	22.22	11.11	4.535	2.795	2.335	1.845	1.900	0.356	2.690	0.895	1.979
502 prr	Healthy	0.0	0.0	0.0	3.530	4.862	2.032	0.969	1.090	0.380	2.562	3.772	1.651
Gisa 6 M	Infected	33.33	11.11	0.0	5.275	5.223	4.186	1.245	2.743	0.492	4.031	2.480	3.694
	Healthy	0.0	0.0	0.0	2.040	2.35	3.805	0.503	1.472	0.437	1.538	1.49	3.369
Gisa 20	Infected	22.22	11.11	0.0	3.785	7.466	5.602	1.070	2.632	0.409	2.715	4.834	5.193
	Healthy	0.0	0.0	0.0	2.298	3.940	3.176	1.069	1.241	1.372	1.226	2.698	1.804
Shandawil I	Infected	11.11	22.22	22.22	3.830	8.427	5.097	1.322	4.488	2.906	2.507	3.939	2.192
	Healthy	0.0	0.0	0.0	4.909	7.696	6.763	1.299	3.215	2.865	3.609	4.481	3.898
A line sourse (sterile)	Infected	0.0	0.0	0.0	1.975	5.642	6.157	0.335	1.137	0.651	1.641	4.505	5.506
	Healthy	0.0	0.0	0.0	3.214	4.011	3.976	1.940	0.563	0.999	1.273	3.449	2.977

* transplanting

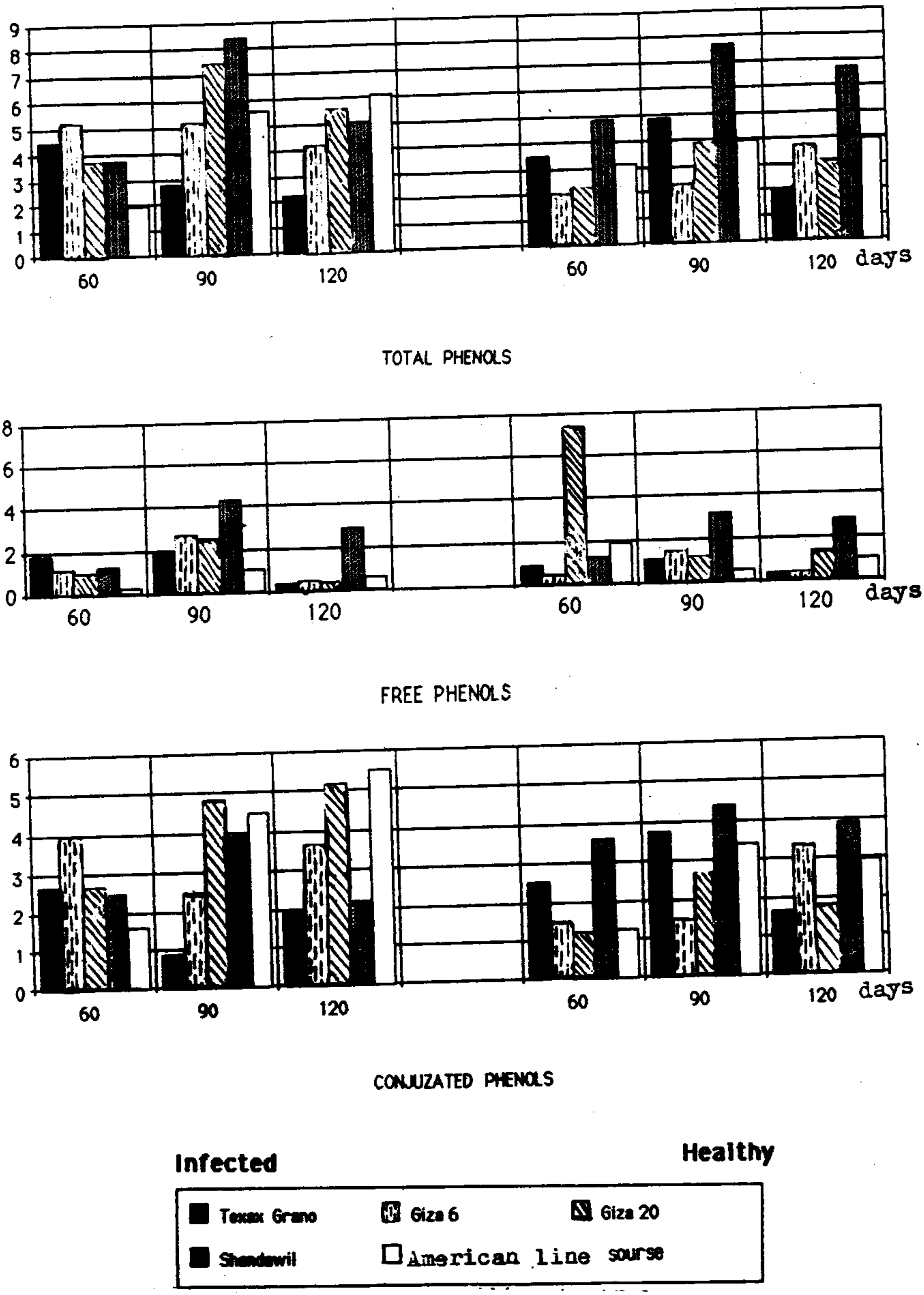

Fig. 2. **Phenol contents in healthy and infected plants with Sclerotium cepivorum under green-house coditions (calculated as mg/g fresh weight)**

days of transplanting. After 90 days of transplanting free phenols increased in the infected plants of all tested CVS. The free phenols decreased in the infected onion CVS than the apparent healthy plants after 120 days of transplanting except Giza 6 M (M.S.) that showed an increase.

Results agree to some extent with those of Hatfield et al. (1948), Farkas and Kiraly (1962) who found that phenolic level was high in diseased plants than in healthy ones. Tomiyama (1963), Das and Ras (1964), Goodman et al. (1967); Ali et al. (1976); El-Basyouni et al. (1976), Bajaj et al., (1980); Radwan (1980), Salem and Michail (1981); Thabet et al. (1983) and Shalaby et al. (1987).

C. Sugar Content:

Results shown in Table (13) indicate that the total sugar content in apparent healthy plants of Giza 20 (M.S.) was very high, and moderate in Shandawil I (M.S.) whereas it was low in the sterile CV (L.S.) and very low in healthy Giza 6 M (M.S.) after 60 days of transplanting. After 90 days of transplanting the total sugar content increased in the apparent healthy plants of all the tested CVS except Giza 20 which decreased whereas prolonging the period to 120 days after transplanting the reduction was high in all the tested CVS except American line source (sterile) (L.S.), which increased.

Table (13) - Sugar content in healthy and infected plants with <u>Sclerotium</u> <u>cepivorum</u> (Iso. No. II) under green-house conditions (Calculated as mg/g fresh weight).

Cultivar	Treat-ment	Percentage of infection days after transpl.			Total sugars			Reducing sugars			Non red. sugars		
		60	90	120	60 days after transpl.*	90 days after transpl.	120 days after transpl.	60 days after transpl.	90 days after transpl.	120 days after transpl.	60 days after transpl.	90 days after transpl.	120 days after transpl.
Texas Grano 502 prr	Infected	22.22	22.22	11.11	138.531	23.775	14.751	6.026	13.021	4.803	132.505	10.754	9.948
	Healthy	0.0	0.0	0.0	17.923	20.100	8.525	6.615	11.728	7.063	11.308	8.372	1.462
Giza 6 M	Infected	33.33	11.11	0.0	13.607	21.948	19.870	10.264	9.340	10.346	3.343	12.608	9.524
	Healthy	0.0	0.0	0.0	8.113	58.274	8.921	4.298	47.808	6.761	3.815	10.466	2.160
Giza 20	Infected	22.22	11.11	0.0	17.081	20.049	28.729	10.324	11.861	6.654	7.862	8.185	22.075
	Healthy	0.0	0.0	0.0	116.544	18.651	17.945	38.373	15.739	12.388	78.171	2.912	5.557
Shanda-wil I	Infected	11.11	22.22	22.22	13.28	155.286	87.204	8.121	16.652	13.424	8.960	138.634	73.779
	Healthy	0.0	0.0	0.0	20.465	23.659	22.599	6.531	15.566	11.279	13.934	8.093	11.120
American line (sterile)	Infected	0.0	0.0	0.0	18.186	22.538	20.508	6.790	7.836	13.596	6.490	7.836	13.596
	Healthy	0.0	0.0	0.0	13.828	14.683	19.123	5.036	13.001	11.958	8.792	1.682	7.165

* transplanting

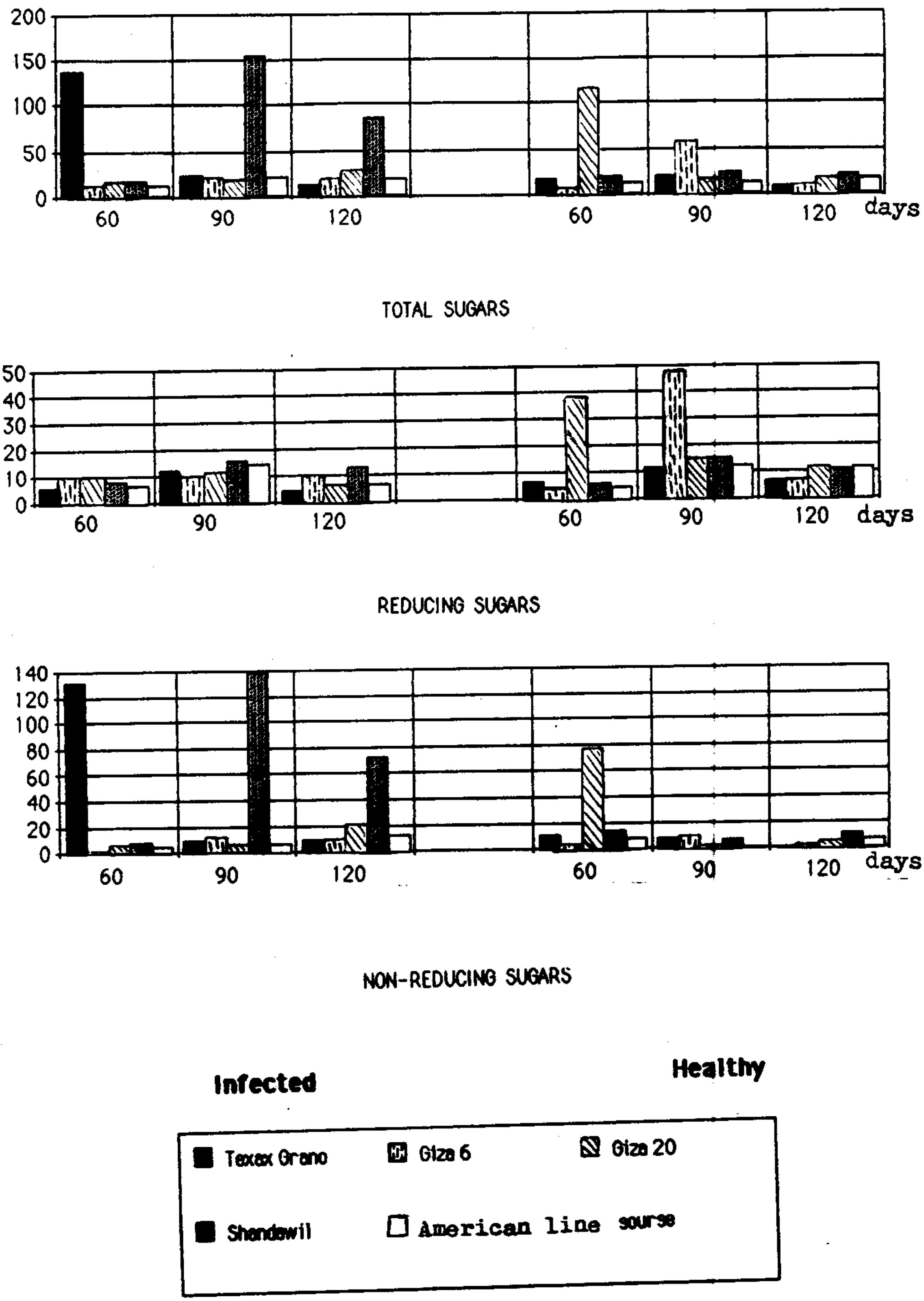

Fig -3 **Sugar contents in healthy and infected plants with *Sclerotium cepivorum* under green-house coditions (calculated as mg/g fresh weight)**