Effect of UV-Radiation on Rhizosphere Fungi of Healthy and Virus-Infected Plants of *Chenopodium amaranticolor* Coste and Reyn

The detrimental effect of the UV-light on higher plants has been the subject of considerable interest[1,2]. POPP and BROWN[3] and LOCKHART and BRODFIIHRER-FRANZGROTE[4] have reviewed the work pertaining to this field of investigations. The effect of UV-rays on the virus-multiplication has also been studied and mostly the rays have been reported to have an inhibitory effect[5–7]. The UV-radiation is quite effective on the foliage of the plants and causes detrimental effect. That the changes in the morphology and physiology of the cover plants exert a pronounced effect on the rhizosphere microflora is almost a well-established finding. In the present study, an effort has been made to investigate the effect of UV-radiation on healthy and virus infected plants of *Chenopodium amaranticolor* Coste and Reyn.

Twelve-day-old seedlings grown in earthen pots were selected for the present investigation. After surface-sterilization with 0.05% $HgCl_2$ solution, the seeds were sown in earthen pots filled with unsterilized soil. Each pot contained 4 seedlings.

In the first set (R) normal healthy plants were exposed to UV-radiation, in the second (R + V), plants were first inoculated with TMV and then irradiated, in third set (V) plants were only inoculated with TMV, and fourth set (C) was kept as control. The plants in first and second sets were UV-irradiated for 1 min from a distance of 1 foot with an ordinary germicidal lamp with a main output of 2537 Å. All the plants were maintained under similar conditions for 5 days, after which the rhizosphere fungal population was assessed by the method described earlier[8]. The fungal population was recorded after 6 days of incubation at 25 °C.

Apparently there was no effect of UV-rays on the plants of set (R), as they were similar in morphological characters to the control. In the second set (R + V) the effect of virus infection on the plants was mild due to partial inhibitory effect of UV-rays on virus multiplication. In set (V) the plants were severely virus-infected.

Of the 22 forms isolated from the different rhizospheres, only *Rhizopus nigricans* was of common occurrence. 14 species were isolated from (R) set, the dominant being *Fusarium* sp. and *Myrothecium roridum*. Other 12 forms occurred with low percentage distribution. 10 forms were cultured from (R + V) set amongst which *Aspergillus terreus*, *Aspergillus nidulans* and *Fusarium oxysporum* were dominants. *Penicillium citrinum* was isolated with very high percentage in set (V) and the only 2 other forms *Rhizopus nigricans* and *A. niger* were present with low frequency. 2 members of Aspergilli, *Aspergillus niger* and *A. flavus* were dominant in the rhizosphere of control set. Comparatively higher number of species was recorded from the rhizosphere of irradiated sets (R and R + V) and least in (V) set. Quantitatively the highest fungal population was obtained from the rhizosphere of (V) set and the lowest in (C) set (Table).

The remarkable variation in the nature of the rhizosphere fungal flora, both in quality and quantity, in the above 4 sets is possibly due to differences in their physiological conditions. Due to UV-irradiation there is change in the physiology of the plants[1,2] which possibly resulted in variations of root exudation which in turn affected the rhizosphere mycoflora.

Irradiation possibly stimulated the micro-fungal population in the rhizosphere region. The mechanism involved in possible stimulatory effect of irradiation on rhizosphere flora is not yet clear from the findings of present investigation. A thorough investigation regarding the effect of UV-irradiation on the physiology of the plant in light of DEERING's[2] suggestion may further enrich our knowledge on interrelation of the host and its rhizosphere microflora in relation to UV-irradiation[9].

Distribution percentage of fungal species isolated from the rhizosphere of *Chenopodium amaranticolor*

Fungi	R	R + V	V	C
Mucor fragilis				2.4
Rhizopus nigricans	4.6	2.2	3.6	8.2
Phycomycetous sterile colony	4.0	2.5		
Phoma sp.		2.4		
Aspergillus niger	6.0	1.0	1.2	42.6
A. flavus	9.8			30.0
A. terreus	2.2	50.8		
A. sydowi	5.0	6.4		
A. nidulans	10.6	16.0		8.4
Penicillium humicola	1.5			
P. notatum	9.2			
P. frequentans	1.0			8.4
P. citrinum	1.0	6.0	95.2	
Monosporium sp.	1.0			
Trichoderma lignorum		0.5		
Curvularia lunata		2.6		
Helminthosporium sp.		0.5		
Botrytis sp.	1.0	10.1		
Fusarium sp.	22.7			
Myrothecium roridum	20.4			
Average fungi/g dry soil	200,754	171,250	461,000	108,125
No. spp.	14	12	3	6

Zusammenfassung. Nach UV-Bestrahlung von gesunden und mit Viren infizierten Chenopodium-Pflanzen (*Chenopodium amaranticolor*, Coste und Reyn) konnte eine Zunahme der Pilzflora in der Rhizosphäre, besonders der infizierten Pflanzen, beobachtet werden.

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