Figure 1. Severe tungro infection on the weed *H. zeylanica* and on T(N)1 seedlings.

zeylanica was performed 30 days after inoculation. Typical yellowing and vein clearing symptoms were observed on the weed.

H. zeylanica, identified for the first time as the host of tungro viruses, assumes significance in explaining the perpetuation of tungro viruses in nature. However, the existence of five species of graminaceous plants harbouring tungro viruses in nature and their possibility of serving as reservoirs of viral inoculum has been reported in India[2]. It has also been shown[3] that the vector *N. virescense* can feed on few plant species including some dicotyledonous plants. Forty-three plant species comprising (6 cereals, 37 species of Gramineae and Cyperaceae including 17 species of *Oryza*) have been tested artificially for their possible role as host for tungro virus and its vector[4]. Their role in nature is not yet known. Therefore, the necessity of a thorough survey of various weeds in different paddy growing areas is necessary for a better understanding of the perpetuation of tungro viruses and to identify collateral plant species harbouring these viruses in nature.

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REVERSAL OF CHLOROFLUORENOL-INDUCED INHIBITION IN ELONGATION OF BARLEY SEEDLINGS BY GIBBERELLIC ACID

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SYNTHETIC growth regulator morphactin has been shown to induce dwarfism in a wide range of plant species[1]. However, its mechanism of action is not fully understood. Most of the studies have been oriented towards its effect on polar auxin transport[2].The role of endogenous hormones in the morphactin-induced inhibition of organogenesis has been studied in leaf ex-plants of *Kalanchoe daigremontiana*[3]. The present study using barley is an attempt to throw some light on the possible role of gibberellic acid (GA) in the morphactin-induced inhibition of elongation growth.

Seeds of huskless barley (*Hordeum vulgare* L. c.v. 292) were soaked in solutions of GA and chlorofluorenol (CFL) at concentrations ranging from 10^{-9} to 10^{-3}M, for 20 hr at 9°C under sterile conditions. The solutions were then decanted and the seeds grown on moistened (with water) filter papers in Petri dishes for 120 hr in 12 hr light (17000 lux, white fluorescent) at 25 ± 1°C. Each value is an average of 5 replicates of 20 seeds each. Distilled water treatments served as controls.

Although a wide range of concentrations were tested, data on only the effective concentrations are presented in the tables. Lower concentrations were generally ineffective. CFL inhibited shoot elongation significantly only at high concentrations (10^{-5} and 10^{-4}M) whereas in root a concentration-dependent inhibition (10–75%) from 10^{-9} onwards was observed (table 1, data not shown for concentrations less than 10^{-6}M). Also, at any particular concentration, the extent of inhibition in elongation of the roots was greater than the corresponding effect on shoot. Similar results were obtained[3] in *K. daigremontiana* where root initiation was inhibited more than shoot initiation after CFL application. Whether this effect is on the hormonal balance (as is the hormonal concept of differentiation[4]) or at the macromolecular level is to be studied. Also, as pointed out by Carmi and Van Staden[5] the hormonal effects on shoot may be a consequence of their

Table 1 *Effect of CFL and GA singly on seelings height (cm) of 5-day-old barley seedlings*

Parameters	Growth regulator (M)				
	DW	10^{-6}	10^{-5}	10^{-4}	10^{-3}
CFL treatment					
Shoot	7.92 ± 0.400	7.36 ± 0.394	6.20 ± 0.234**	5.58 ± 0.219**	–
Root	6.19 ± 0.237	4.38 ± 0.469**	3.33 ± 0.379**	1.59 ± 0.162**	–
GA treatment					
Shoot	7.92 ± 0.400	7.88 ± 0.179	7.98 ± 0.663	9.10 ± 0.242*	10.52 ± 0.467**
Root	6.19 ± 0.237	5.71 ± 0.090	5.79 ± 0.495	5.57 ± 0.245	5.04 ± 0.700

*$P < 0.05$; **$P < 0.01$.

Table 2 *Interaction between CFL and different concentration of GA on seedling height; per cent over control*

		GA (M)						
			10^{-5}		10^{-4}		10^{-3}	
CFL (M)	Parameter	DW	Exp.	Obs	Exp.	Obs	Exp.	Obs
10^{-6}	Shoot	− 7.1	− 6.3	− 7.6	7.8	• 6.7	25.8	32.1
	Root	− 29.2	− 35.7	− 33.6	− 39.2	− 35.7	− 47.8	− 30.4
10^{-5}	Shoot	− 21.7	− 21.0	− 14.1	− 6.8	− 8.5	11.1	12.9
	Root	− 46.2	− 52.7	− 37.2	− 56.2	− 40.0	− 64.8	− 41.4

Obs. = [(CFL + GA)/DW] − DW × 100; Exp. = [(CFL − DW)/DW] + [(GA − DW)/DW] × 100.

effects on root characteristics. The inhibition of root elongation can also be attributed to the inhibition of polar auxin transport by morphactins[1,2]. GA enhances shoot elongation significantly at high concentrations whereas in root it was ineffective (table 1). Some of the inhibitory characters of morphactin could be counteracted by GA[1]. Because of the structural similarity between GA and morphactins even an inhibition of competitive nature has been suggested[6]. The interaction studies between GA and CFL show a gradual increase in the observed and expected values in shoot with an increase in GA concentration (table 2). The increase in expected value is due to a concentration-dependent enhancement in elongation by GA. The corresponding increase in observed values (especially at 10^{-3}M where it is more than the expected value) shows a reversal of the CFL effect by GA. In other words as the GA concentration increases the reversal becomes more pronounced. There is a certain degree of antagonism between CFL and GA in root elongation. However, a role for GA in the CFL-induced inhibition cannot be envisaged because GA as such has no effect on root growth. Also, the observed values do not increase with increasing GA concentration, thus ruling out any concentration-dependent effect.

In conclusion it can be said that the effect of CFL is greater on factors controlling root growth than on shoot growth. That GA is able to enhance shoot growth as well as reverse the inhibitory effect caused by CFL points towards a role for GA in the case of the CFL–induced inhibition of shoot growth, while in the case of root, GA apparently has no role. Also, as suggested earlier[7] the action of GA is organ-specific.

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MYCOFLORA ON UNBLOOMED FLORAL BUDS OF *PAPAVER SOMNIFERUM* L.

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WHILE studying the mycoflora of phylloplane of *Papaver somniferum* at the fruiting stage of the plant it was noticed that some of the flower buds remained unbloomed consequent upon which they dry and decompose while still attached to the plants. The successional pattern of the fungi on decaying unbloomed buds was studied.

Ten unbloomed flower buds were collected at random from the experimental plot starting from the second week of January when unbloomed buds were first seen to be drying. Sampling was continued for 50 days till the first week of March when the decaying buds became fragmentary and started falling due to advanced decomposition. The microfungi were isolated by the moist chamber method. The chambers were prepared by keeping exactly fitting blotting paper discs in the sterilized petri dishes (9 cm dia) and moistening them with sterile distilled water. Five such petri dishes were taken and two buds were aseptically kept in each plate and were incubated at 25 ± 1°C for five days. Appropriate amount of water was added periodically to moisten the blotting papers. The fungi were identified and recorded at an interval of five days till the material became fragmentary.

The fungal species and their per cent colonization are given in table 1.

In all 11 fungi were isolated from the unbloomed buds of *P. somniferum* of which 3 were Zygomycetes (27.27%) and 8 were Deuteromycetes (72.73%). It was interesting to note that all the three Zygomy-

Table 1 *Fungal species and their per cent colonization on unbloomed and decaying floral buds of Papaver somniferum*

Fungal species	Incubation period (days)									
	5	10	15	20	25	30	35	40	45	50
Absidia repens	50	40	40	–	–	–	–	–	–	–
Alternaria alternata	10	–	20	20	–	–	–	–	–	–
A. tenuissima	–	–	20	10	10	–	–	–	–	–
Aspergillus flavus	–	–	–	–	–	40	60	50	50	40
A. luchuensis	–	–	–	–	–	30	40	40	20	30
A. sydowi	–	–	–	–	–	–	20	20	10	–
Cepholosporium acremonium	–	20	40	10	–	–	–	–	–	–
Fusarium dimerum	–	–	–	–	–	40	10	–	40	40
F. semitectum	–	–	–	20	40	20	10	–	–	–
Mucor hiemalis	80	60	60	30	30	10	–	–	–	–
Rhizopus nigricans	10	20	10	–	–	–	–	–	–	–

'—' = Absent.