Table 1. Responses of different genotypes to root applied auxins

Lines tested	Auxin effects: Uptake	Metabolism	Morphogenesis
var. pseudoroseum 'Kleine Rheinlanderin'	2,4-D >2,4,5-T	Free auxin	Inhibited, abnormal
'Dippes Gelbe Viktoria' var. nigro-violaceum	>NAA >IAA	Amino acid conjugates	Similar to control
var. hibernieum ssp. arvense			

1. Ingensiep, H. W., M. Hertl, and H. L. Jacobsen. 1981. PNL 13:21-23.
2. Ingensiep, H. W. 1982. PNL 14:19-20.

A TEST SYSTEM FOR SHOOT APPLICATION OF AUXINS COMBINED WITH PHOSPHOLIPIDS USING SEEDLINGS OF PISUM SATIVUM

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A test system is described which allows us to characterize the auxin-sensitivity and effects of phospholipids in auxin solutions following application to the shoots of young pea seedlings. Co-applied phospholipids may be useful to reduce the amount of herbicides as has been demonstrated previously in field experiments by Maas (1). Simple test systems as introduced here may be a practical means of screening for substances which reduce the amount of auxin-herbicides or of identifying mutants of Pisum with abnormal auxin-sensitivity.

The test system is schematically summarized in Fig. 1. One-week-old etiolated seedlings cultivated on moist vermiculite were further cultivated for two days under a light/dark rhythm of 16 hr/8 hr to induce light dependent morphogenesis. Then the auxins were applied to the shoots by dipping the top of the epicotyl in aqueous auxin solutions (10^{-4} M) with and without phospholipids (0.02%). As typical auxin-herbicides we used ^{14}C-labelled 2,4-D, 2,4,5-T, and MCPA. After this treatment the seedlings were again cultivated on moist vermiculite and the uptake or radioactivity was measured during the following 24 hours. At each measuring point the seedlings were dipped in ethanol to remove the surface-associated auxin and after that the shoot tissue was extracted by an ethanol procedure. Auxin-radioactivity on the shoot and in the shoot were obtained and measured by a liquid scintillation counter. The distribution of radioactivity one week after the shoot application was also measured by autoradiography of the whole seedlings on X-ray films.

These experiments showed that the presence of phospholipids in the aqueous auxin solutions enhanced the detectable auxin-radioactivity on the shoot surface up to three times and in the shoot tissue up to two times compared with solutions containing only the auxins. Moreover, the analysis by autoradiography showed broader spots of radioactivity on the leaves if phospholipids were present in the solutions. Also the typical

morphogenetic response during further cultivation was more drastic if the auxin solutions contained phospholipids. Our first experiments in a test system for shoot application of auxins combined with phospholipids confirm the results obtained in long-time field experiments by Maas (1), who found that when phospholipids were jointly applied with herbicides, the herbicide amount needed to kill several weed3 could be reduced by as much as 50$. Thus, this test system with young pea seedlings and auxins seems to be a reliable and practical method of pre-screening substances (like phospholipids) that reduce the environmental damage by high amounts of auxin-herbicides.

1. Maas, G. 1982. Nachrichtenbl. deut. Pflanzenschutzd., 34(8).

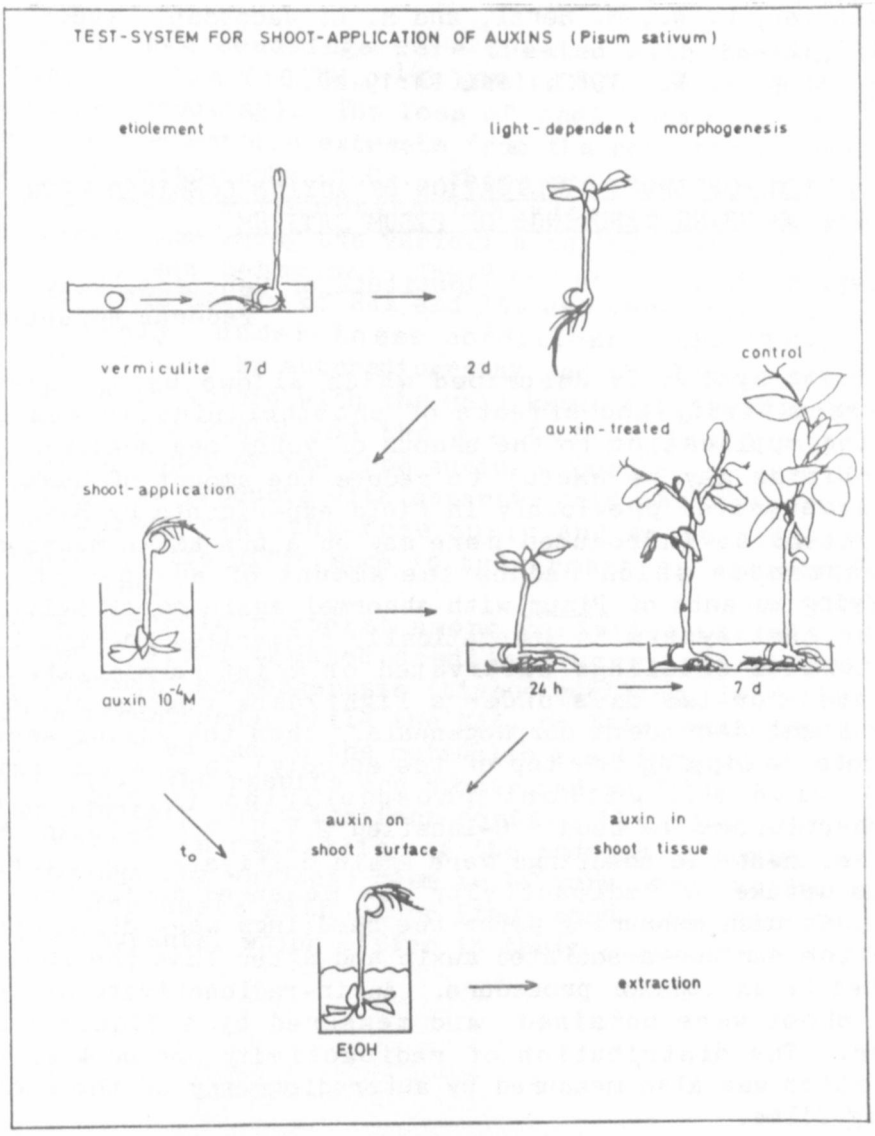

Fig. 1. Test system for shoot-application of auxins (Pisum sativum).