# ROOT-INDUCTION IN AVENA MESOCOTYLS BY INDOLE ACETIC ACID

B. HUISINGA

Botanisch Laboratorium, Utrecht

SUMMARY

IAA in injuriously high concentrations causes root formation in *Avena* mesocotyls, which under normal conditions never produce roots.

In the course of the research on the influence of light on a number of phenomena in *Avena* seedlings we saw that treatment with indole acetic acid (IAA) caused roots to be formed in the mesocotyl. Normally no roots occur in the mesocotyl of *Avena*.

We did some experiments to obtain information on the range of IAA-concentrations causing this effect.

*Avena* seedlings were cultivated in darkness for 4 days. In dim green light they were cut from roots and seeds. The lower approx. 2 mm of the excised seedlings were treated with a solution of IAA in tapwater. The seedlings were left in the solution for 12 or 24 hours and transferred to tapwater after having been rinsed shortly to remove the IAA solution. In some experiments they were left in the solution till the end of the experiment. In some experiments the coleoptile and primary leaf were removed by cutting through the node. Six days after cutting the seedlings the number of roots initiated was counted.

Table 1. Formations of adventitious roots on mesocotyls of *Avena* seedlings, after 6 days in a solution of IAA.

| concentration IAA (g/ml) | mean of number of roots of 20–30 seedlings |
|---|---|
| $1 \times 10^{-4}$ | $3.85 \pm 0.47$ |
| $3.3 \times 10^{-5}$ | $0.28 \pm 0.11$ |
| $1.1 \times 10^{-5}$ | $0.54 \pm 0.58$ |
| $3.7 \times 10^{-6}$ | $0.11 \pm 0.06$ |
| $1.2 \times 10^{-6}$ | $0.07 \pm 0.07$ |
| $4 \times 10^{-7}$ | 0 |

*Table 1* and *2* show the results of some typical experiments. *Table 1* shows that only high concentrations of IAA can induce root formation. *Table 2* shows the results of an experiment in which mesocotyls, derived from all parts above the node, remained 12 and 24 hours in solutions of IAA. Also, this experiment shows that only very high concentrations of IAA can induce appreciable amounts of roots. In all experiments necrosis of the lower part of the mesocotyl

Table 2. Formation of adventitious roots on mesocotyls of seedlings of *Avena* after removal of all parts above the node, treated for 12 or 24 hours with IAA. Counted after 6 days

| concentration IAA (g/ml) | mean of numbers of roots of 20–30 seedlings | |
|---|---|---|
| | 12 hours | 24 hours |
| $1.0 \times 10^{-3}$ | $4.50 \pm 0.25$ | totally necrotic |
| $0.5 \times 10^{-3}$ | $8.45 \pm 0.45$ | $4.63 \pm 0.79$ |
| $1.0 \times 10^{-4}$ | $1.19 \pm 0.19$ | $1.62 \pm 0.35$ |

REFERENCES

SOEKARJO, R. (1965): On the formation of adventitious roots in cuttings of Coleus in relation to the effect of indoleacetic acid on the epinastic curvature of isolated petioles. *Acta Bot. Neerl.* **14**: 373–399.

occurred: the higher the concentration used and the longer the mesocotyls were left in the solution, the greater the part that proved to be necrotic. This accounts for the relatively low number of roots shown in *table 2* after a stay of 12 hours in a solution of $1.0 \times 10^{-3}$ g/ml IAA and the relatively low number of roots after a stay of 24 hours in a solution of $0.5 \times 10^{-3}$ g/ml IAA as compared with plants that remained only 12 hours in the same solution. In both cases this low number of roots is due to necrosis of a large part of the mesocotyls.

These results are comparable with the results of SOEKARJO (1966). He postulated a hypothesis that root formation may be stimulated by injurious treatments. His explanation fits in with our results very well.