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This Week's Citation Classic™

Hare R C. Indoleacetic acid oxidase. *Bot. Rev.* **30**:129-65, 1964.
[Inst. Forest Genetics, Southern Forest Experiment Station, Forest Service, US Dept. Agriculture, Gulfport, MS]

This paper provides a review of 128 publications on indoleacetic acid (IAA) oxidase. Discussed are its definition, occurrence in nature, distribution in the plant, physiological function, specificity, chemistry, mechanisms of action, oxidation products, factors influencing activity of the enzyme, and assay techniques. [The *SCI*® indicates that this paper has been cited in over 110 publications since 1964, placing it among the ten most-cited papers published in this journal.]

Robert C. Hare
Southern Forest Experiment Station
Forest Service
US Department of Agriculture
Gulfport, MS 39595

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"In the early 1960s, my research at Gulfport included studies on rooting of pine cuttings and resistance to fusiform rust. Cuttings from pine old enough to select for superior traits are very difficult to root, but if this problem could be solved, an operational rooting method would accelerate genetic gains in tree improvement programs. Fusiform rust is a serious disease of southern pines, and the only field control available is by breeding for resistance. Indoleacetic acid (IAA, auxin) appears to be intimately involved in both rhizogenesis and fusiform rust gall formation. Indeed, I have found much greater auxin activity in young, easy-to-root pine seedlings and in young galls than in older trees or in healthy stem tissue. Low auxin may limit rooting, witness the success of rooting powders containing IAA or synthetic auxins, but other factors also limit rooting of tissue from older trees. High auxin activity is typical of many galls and tumors, presumably being responsible for the hyperplasia which results in the swelling.

"I then became interested in IAA oxidase as a possible biochemical marker for both rootability and fusiform rust resistance. I reasoned that high IAA oxidase activity might inhibit rooting and gall formation by inactivating the auxin needed for these responses. So I made a thorough search of the IAA oxidase literature and wrote a review for my study plan. It then occurred to me that other researchers might benefit from this review, so I submitted it to the *Botanical Review*. Incidentally, this review did not go through the peer review system. The usual routine is to get three peer reviews outside the Southern Forest Experiment Station before submission to the journal, which may then send it to two or three more referees. I simply had my lab colleagues look it over before sending it to the journal, which did not have it reviewed. So much for the system.

"I think timing may explain why the review was cited so frequently. Of the 128 references reviewed, 106 were published between 1955 and 1962. Everybody was on the IAA oxidase bandwagon then, and it still remains an active research field. Another factor promoting this paper may be the paucity of IAA oxidase reviews in the 20 years since its publication. There has been one recent IAA oxidase review,[1] and some work on conifers.[2]

"One thing I have regretted somewhat is that I tried to introduce new nomenclature for IAA oxidase. In the interest of brevity, I substituted 'auxinase,' abbreviated AA. Using AA did save some typing, but it never caught on, and it may have been a hindrance to readability because readers were unfamiliar with the term. The impreciseness of 'auxinase' was probably its downfall, because IAA oxidase does not work on all auxins."

1. **Catalina L, Valpuesta V & Sarmiento R.** The indoleacetic acid oxidase of plants. *An. Edafol. Agrobiol.* 39:343-50, 1980.
2. **Johnson M A & Carlson J A.** Indoleacetic acid oxidase and related enzymes in cultured and seedling Douglas fir. *Biochem. Physiol. Pflanz.* 174:115-27, 1979.

