

BOTANY

# Hormones for Plants Cause Rapid Sprouting and Growth

## Chemicals Producing Strange Whiskers on Plant Roots Being Tested in Canadian Wheat Areas to Judge Value

**H**ORMONE dust, a sort of magic face powder for seeds and plant cuttings, promises to speed agriculture in field and garden, as the result of investigations of the Canadian National Research Council.

Wonder-working synthetic chemicals that grow roots on seeds and slips of plants many days before they otherwise would sprout are now ground into talc and other inert dusts for easier and more effective application.

Experiments of Dr. N. H. Grace, NRC scientist, are being extended this year to large field trials of actual grain production in various parts of Canada.

The use of chemical stimulants, plant hormones they are called, is not new. For the past few years scientists and gardeners have been using such complex chemicals as naphthylacetic acid, indolylacetic acid and indolylbutyric acid, all synthetically made from coar-tar and other substances, for getting roots started faster and more vigorously. Roots can even be made to grow where they would not normally appear.

The Canadian improvement is in the manner of application. Instead of putting the hormone chemicals in water and applying them that way, they are distributed in fine dust. It is easier to roll the seeds in the dust and stick the cuttings in fine powder.

### Plant Face Powder

The dust most often used is talc, the same sort of mineral that is used in making face powder in cosmetics. But charcoal and other inert dusts are sometimes used.

Wheat on the western plains may be able to get its roots in the soil faster and more securely if the seed wheat is dusted with hormones. In some cases this may mean the difference between getting a crop and not getting it. Winds are likely to blow the young sprouting seeds out of the ground if the roots do not anchor them speedily. Since the synthetic chemical treatment causes the roots to "dig in" promptly, wheat so treated may withstand wind and drought at an earlier time after seeding.

The hormone dusting adds practically nothing to the cost of the seeding operation. Farmers already dust their seed with poison to kill fungus, and it is only necessary to add the chemical hormone to the dust previously used. Demand is reducing the cost of these synthetic chemicals, and naphthylacetic acid costs about \$10 per pound. Seed for several thousand acres can be treated with a pound. Thus the treatment costs only about half cent an acre.

Pioneers in plant hormone research were Drs. P. W. Zimmerman and A. E. Hitchcock of the Boyce Thompson Institute for Plant Research, Yonkers, N. Y., who in 1935 showed that some 16 new chemical substances would grow root "whiskers" upon plants, even in the most fantastic places, such as upon the flowers. They applied their chemicals as solutions in water or as salves.

### Tiny Amounts Effective

Extraordinarily small amounts of the chemicals are needed. For instance, naphthylacetic acid is effective in a water solution containing one part per hundred million, and a single pound of it would make ten train loads, with each train of 100 tank cars, and every car containing 12,500 American gallons.

Dr. Grace has found that the dust application of the plant hormones spreads their effects over a longer period than is the case when they are applied in a water solution. The solution method has a single shot effect, so to speak.

For propagating plants by cuttings and for prompt rooting of seedlings, the plant hormone dust is also being used. Forestry programs may be speeded up materially by use of cuttings from trees made to root by the dust applications to the stems. Use of such cuttings instead of seedlings may result in a year or two of time being saved in getting trees started.

Some hope has been held out that the chemical treatment will, in addition to getting the plant well started earlier, increase yields and produce earlier ripening. But the investigators do not encourage the expectation of this result,

preferring to await the results of field experiments now under way.

Farmers and gardeners will be using these new chemicals in coming years if the plant hormones live up to the promise. They will be talking glibly of these strange sounding chemicals. And no doubt the chemists and plant physiologists will be working out new chemicals to produce still more wonderful and more useful effects.

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ZOOLOGY

## Woodpeckers and Man Studied in New Book

**W**OODPECKERS and man form the uniquely combined subject of a new book entitled, *The California Woodpecker and I*, written by Dr. William Emerson Ritter, honorary president of Science Service and professor emeritus of zoology at the University of California.

More specifically, as indicated by its title, the book is about one species of woodpecker and one individual man, the author himself. He made his study of the remarkable acorn-storing birds during several years of frequent trips and longer sojourns in the oak-covered hills of the Pacific Coast.

Unlike as they are in structure as well as in physical and mental functionings,



**DIPPED**

*This is how scientists dust plant cuttings with chemical plant hormones to test effectiveness of treatment on growth. The cuttings are dipped into the can of plant hormone powder, and then, with powder adhering, are ready for planting.*



#### LIKE BEARDS OF THE DWARFS

*These are barley roots raised from seeds dusted with chemicals and then grown two weeks in non-nutritive sand. Left to right: roots from undusted seeds, roots from seeds dusted with 2.5 parts per million of naphthylacetic acid, roots from seeds dusted with higher, but less effective concentrations.*

there are some curious parallelisms between California woodpeckers and human beings—even rather “advanced” human beings. Unlike other woodpeckers, the California species is decidedly socialized—almost a communist in some respects.

The bird is an acorn-storer, jamming the nuts into holes which it drills into trees, telephone poles, and buildings. But the enterprise is communal: the woodpeckers all store their acorns in the same tree trunk, and help themselves at will when they are hungry. They act together to drive off marauding squirrels that would steal the stores.

Instead of working strictly in pairs to chisel out holes for nesting, they labor in little groups of threes and fours. Even in feeding the young, there may be supernumerary adults on the job. Also, they excavate a different type of hole, not used for nesting but for “residence,” into which as many as half-a-dozen may occasionally crowd themselves.

For all their prudence in gathering into barns, the California woodpeckers are by no means always wise. They will drop acorns into hollow places where they can't recover them. They will lay up far more food than they are ever

likely to use. And they will carefully store such things as pebbles—which they can no more eat than we can eat gold bars.

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#### HYGIENE

### New Health Phrase: Vocational Hygiene

**A** NEW phrase and a new viewpoint about health have put in their appearance. The phrase is “vocational hygiene,” which is the title of a new book by Daniel Caplin, assistant director of health education for New York City, and S. G. Ocean, acting chairman of the health education department of the Murray High School in the same city.

The point about this phrase and the book itself is that the innumerable discussions and studies of industrial hygiene and occupational diseases have nearly all been undertaken from the viewpoint of having outside agencies—health departments and industrial concerns—protect the worker's health.

The Caplin-Ocean book, while not minimizing the importance of this type of health protection, approaches the sub-

ject from a different angle and tells what the worker himself can and should do to protect his health. The book is designed as a text for vocational schools, but seems worth even wider reading and study.

Diet, fatigue, posture, personal cleanliness, recreation, outdoor exercise and safe working habits are health factors which no employer, however well-intentioned, and no health officer, however vigilant, can do as much about as the worker himself.

Safety devices and protective appliances—goggles, for example, and respirators—do not protect the worker nor prevent accidents if they are not used, or are used incorrectly. When first aid kits and medical departments are provided, it is still up to the worker to use them to prevent infection if he cuts his finger or gets a cinder in his eye.

Part of vocational hygiene, it appears from the book, is the proper use of tools to prevent accidents. Another part is the wearing of suitable clothing while on the job. Both a loose cuff and a dangling necktie seem obvious hazards but probably their very obviousness causes them to be forgotten at times.

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#### AVIATION

### Device Shows Dispatchers Direction of Incoming Planes

**A** NEW device which, by determining the direction from which an approaching airplane's radio transmitter is sending signals, enables airplane dispatchers to know the direction of approach of incoming planes though weather conditions may make the planes invisible has been developed by scientists of the Bell Telephone Laboratories.

Intended as an additional safeguard for private and commercial radio-equipped aircraft, the new device locates a tiny green light speck on a frosted glass screen in accordance with the direction from which the plane is coming. The points of the compass are marked around the screen's edge.

The system provides for indications on any ten wavelengths which may be selected remotely. As each pilot talks to the control tower at his destination, the spot of light waves moves instantly to its correct position on the screen of a cathode ray tube. A pick-up antenna of special design is employed; this may be situated at any remote point. A single telephone line connects antenna and dispatcher.

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