

Because the supply is still somewhat small, the amount which can be allotted to any one applicant for this year's sowing will be limited to not exceeding 40 bushels. Distribution in 1946 will be under contract, the grower giving the Experiment Station an option on a portion of his increase, for the purpose of aiding other growers to obtain seed in 1947 should they so desire.

Inheritance in a Bread Mold

New words come into common use from the activities of scientists and some are of such importance they should become familiar to the general reader. Most of us have learned new words and gathered new ideas since the atomic bombs exploded. I wish to call attention to two words, chromosomes and genes, about which many readers of the Bimonthly have read. Recent studies have given added interest to these terms. All organisms are composed of minute bodies known as cells but those cells concerned in reproduction are of particular interest to the student of inheritance. Each cell, and particularly each reproductive cell, contains a nucleus which in turn carries a limited and definite number of slender chromosomes. And each chromosome carries a large number of very small bodies called genes. Each gene, small as it is, is more or less responsible for the characters of the mature plant or animal. If a gene is lacking or fails to work, the effect may be striking. A human being or a mouse or a rat possessing hair without color and with red or pink eyes, an albino, has this peculiarity resulting from the lack of a single gene.

One may ask how bodies, too small to be seen under the microscope, have been found to exist. Recent work furnishes further evidence that genes really exist. A number of men in California at Stanford University have taken a bread mold, *Neurospora*, grown it under culture and treated it with x rays. This mold has the happy faculty of needing but one vitamin, the one known as biotin, belonging to the B group. Provided with biotin, certain minerals and carbon and nitrogen, it makes its normal growth and in this process it has the remarkable capacity to form for itself proteins containing 20 or more amino acids, at least nine vitamins of the B group, and countless other substances necessary for its normal growth. We humans have to take some of vitamins already made and our proteins are made from amino acids many of which necessarily come from outside sources. But when the spores of this mold are treated with X-rays, a few of the offspring are found which lack their mothers' ability to manufacture one or more of the vitamins or amino acids needed and as a result of this the mold fails to grow unless artificially fed. In over 80,000 individual cultures which have been made, each starting from a single microscopic spore, many mutations (or changes transmissible to succeeding generations)

Composition of Dust Mixtures used in the trials

- 1D Cuprocide 5% (metallic copper 4%); Gesarol, (DDT 5%)
- 5D Cuprocide 5% (metallic copper 4%) Quik Kill 33 1/3%
- 23D Cuprocide 5% (metallic copper 4%); Gesarol, (DDT 5%); Pyrocide (.1% Pyrethrins)
- 24D Tri-Basic Copper Sulphate 10% (metallic copper 5.2%); Quik Kill 33 1/3%
- 25D Tri-Basic Copper Sulphate 10% (metallic copper 5.2%); Gesarol, (DDT 5%)
- 26D Tri-Basic Copper Sulphate 10% (metallic copper 5.2%) Quik Kill 33 1/3%, Lethane B-71 14%
- 29D Dow Experimental Dust F-508 —DN (Dinitro) 1%; Metallic Copper 7%

Composition of Spray Mixtures used in the trials

- Concentration per 100 gal. water
- 4S Dithane*-Zinc Sulphate-Lime; Gesarol (DDT 1/2 lb.)

- 7S Dithane-Zinc Sulphate-Lime; Quik Kill 5 lb.; Lethane B-72 3 lb.
- 8S Cuper Spray** 5 lb., (Metallic Copper 1.2 lb.); Gesarol (DDT 1/2 lb.)
- 10S Fermate 2 lb.; Deenate (DDT 1/2 lb.)
- 17S Dithane-Zinc Sulphate-Lime; Quik Kill 5 lb.
- 19S Copper A 3 lb. (Metallic Copper 1.35 lb.); Deenate (DDT 1/2 lb.)
- 20S Kopper King 5 lb. (metallic copper 2.6 lb.); London Purple 5 lb.
- 21S Dithane-Zinc Sulphate-Lime; London Purple 5 lb.; Lethane B-72 3 lb.
- 22S Kopper King 5 lb. (Metallic Copper 2.6 lb.); Quik Kill 5 lb.
- 23S Cuper Spray 5 lb. (Metallic Copper 1.2 lb.) Quik Kill 5 lb.
- 24S Copper A 3 lb. (Metallic Copper 1.35 lb.); Quik Kill 5 lb.; Lethane B-72 3 lb.

Inheritance in a Bread Mold

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have resulted where each one characterizes a loss in the bread mold in its ability to make a vitamin or an amino acid.

The elegance of these experiments lies in part in the highly accurate demonstration of the presence of genes responsible for the different characters. This comes about from the fact that the *Neurospora* plant, unlike the plants and animals most familiar to us, has but a single set of chromosomes for most of its life history. Thus there are but two kinds of offspring from a hybrid, the new mutants and the original type. Eight spores of one of the generations are formed in a small sac and if the spores result from a cross, four of them, arranged in regular order in the sac, produce the mutated mold, and four of them, the non-mutated mold. As this has happened very many times, no other conclusion seems possible than that there are separate chemical particles located in the chromosomes at different points, genes, each of which is responsible for a character in the organism or acts as a modifier of that character. Besides the additional light these studies have thrown upon inheritance, the various new forms of the mold furnish new and highly sensitive mediums for the testing of the presence of various vitamins. It is interesting that this obscure colorless plant has demands in the way of vitamins and basic foods similar to the human organism. (L.R.W.)

*All Dithane mixtures 1/2 gal. Dithane D-14, 1 lb. Zinc Sulphate, 1/2 lb. Lime

**Cuper Spray—A prepared spray formulation containing 30% Cuprocide (metallic copper content 24%)