

Geneticists Perfect New Hybridization Method

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our present concepts of world food production to be changed markedly.

The biologists emphasize that use of parasexual hybridization to produce new crop varieties

requires more development. Dr. Carlson stated, however, that "The remaining problems are technical rather than theoretical. We know what can be done using a model system. Now the crucial task is to characterize the special

requirements of the individual species and hybrid desired from parasexual reproduction."

At Brookhaven National Laboratory, the scientists used two species of tobacco plants that had previously been hybridized

by standard genetic crosses, thus providing a basis for comparison with the hybrid produced by the parasexual method. The plants produced by both methods were identical in all respects.

Using two species of tobacco

(*Nicotiana glauca* and *N. langsdorffii*), large numbers of leaf cells were isolated and the cellulose walls which surround these cells were removed by enzymatic digestion.

Many of these wall-less cells (protoplasts) were then fused following simple chemical manipulations

The resulting mixed population of normal and fused protoplasts was placed in a regenerative culture medium which would only support the growth of the fused cells containing the desired hybrid genetic information. The fused cells which grew into colonies were then removed from the regenerative medium and placed in another medium completely devoid of hormones

This procedure prohibits growth of tissue from the individual parents but allows the hybrid to form rudimentary shoots and leaves. The hybrid shoots were then grafted onto the freshly cut stems of one of the parents (*N. glauca*) where they grew into fertile, mature plants

These plants were examined for distinguishing biochemical, cytogenetic, and morphological characteristics. The hybrid produced by the fusion of two leaf cell protoplasts resembled in every respect the hybrid between the same two species produced by standard sexual techniques.

The research on parasexual hybridization is supported principally by the Division of Biomedical and Environmental Research, U.S. Atomic Energy Commission.

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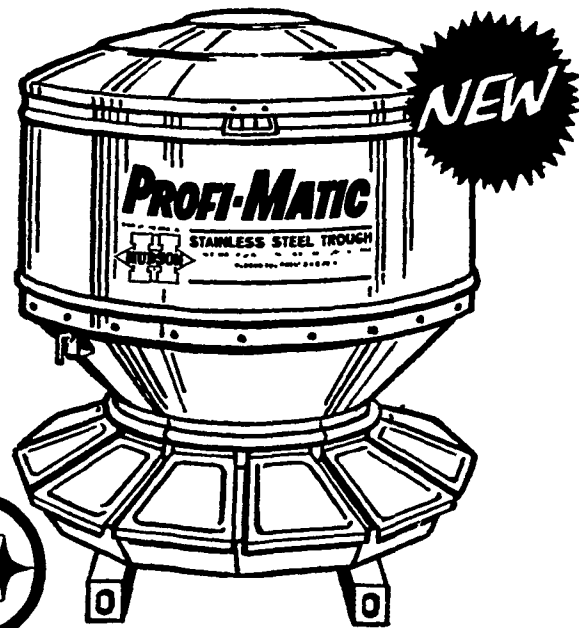
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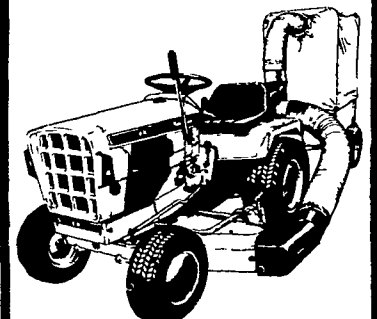
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