the presence of GA_3 were further developed than stamens in the female buds formed on IAA media.

The present is the only report, to our knowledge, of a successful culture of young floral buds and a direct, differential effect on their male and female parts. Work is now in progress with potentially female and hermaphrodite floral buds, as well as with buds of still earlier developmental stages, which can exhibit a somewhat different behaviour (a greater tendency to ovary formation).

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Clonal Propagation as a Practical Means of Exploiting Hybrid Vigour in Rice

MARKED vigour has been observed in rice by a number of workers in the F_1 generation of many crosses in respect of height, number of ear-bearing tillers, number of spikelets and yield. But it has not been possible to exploit this phenomenon, as hybrid seed production is a limiting factor in this crop. One method of taking advantage of the hybrid vigour might be to multiply the F_1 plants vegetatively. The technique of vegetative propagation in rice varieties which possess perennating habit has been studied intensively at the Central Rice Research Institute from 1959 onwards. Its value has now been established as an aid to increased rice production. The great potentiality of this technique is shown by the fact that all the clones to be planted in an acre have been derived by repeated multiplication of the tillers produced from two to three stubbles (clones) of the preceding crop. The number of repeated multiplication (3–6 times) depends on the nature of rice variety utilized. The increased yield, obtained by this procedure, ranged from 17 to 61 per cent, as compared with crops raised from normal rice seedlings.

Experiments were continued during 1961 involving a number of improved varieties together with their hybrids in F_1 and F_2 generations in order to obtain more information on the usefulness of this practice.

In six cross-combinations, it has been found that a sufficiently good crop could be obtained from F_1 plants, multiplied vegetatively (Table 1).

To test the effectiveness of this technique at the F_2 generation, stubbles of eleven F_2 plants were propagated vegetatively from a cross between *J*.192 (a selection from a fine-grained variety of Orissa) and *GEB*.24 (a popular variety of Madras). The fourth tiller-separation stage was the final planting of the clones as a field crop in the main season and the results are presented in Table 2.

Table 1. F_1 PLANTS OF DIFFERENT CROSS-COMBINATIONS OF RICE VARIETIES, MULTIPLIED VEGETATIVELY AND FINALLY PLANTED DURING THE MAIN SEASON OF 1961

Cross-combination F_1	Total No. of plants at final planting (12 in. × 6 in.)	Area occupied (acres)
W.114 × *GEB*.24	36,657	0·42
GEB.24 × *G.S*.137	25,520	0·29
PTB.10 × *W*.112	2,532	0·03
CH.45 × *W*.135	17,888	0·20
W.140 × *T*.412	61,080	0·70
JBS.120 × *T*.141	17,482	0·20

Table 2. VEGETATIVE MULTIPLICATION OF F_2 PLANTS AND PARENTS FROM A CROSS, *J*.192 × *GEB*.24, CARRIED OUT DURING 1961

Material	No. of tillers first planting	No. of tillers second planting	No. of tillers third planting	No. of tillers fourth planting (final planting 12 in. × 9 in.)	Area occupied (acre)
J.192 (parent)	15	76	430	6,703	0·12
GEB.24 (parent)	27	81	325	3,433	0·06
F_2 plants					
1	18	123	940	10,020	0·17
2	14	87	675	9,440	0·16
3	15	202	1,832	22,832	0·39
4	17	157	1,425	13,480	0·23
5	20	113	800	8,738	0·15
6	15	142	1,366	13,250	0·23
7	15	167	1,318	13,140	0·23
8	13	48	369	5,026	0·09
9	23	109	1,050	9,848	0·17
10	16	88	950	7,655	0·13
11	24	148	1,350	7,740	0·13

Considerable variability was observed in the individual F_2 populations in respect of multiplication of plants (tillering potential) and all the F_2 plants had shown higher production capacity except one (No. 8), as compared with the parents. These observations indicate the possibility of exploitation of hybrid vigour at the F_2 stage as well, with an added advantage that F_2 plants with desirable recombinations can be picked up.

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Intercellular Cohesion and Expansion Growth in Higher Plants

FREQUENTLY the growth of plant organs such as the root or coleoptile is considered in terms of the changing number, or size, of the component cells, and the effect of experimental treatments (or environmental changes) on the overall growth is considered in relation to the primary metabolism of the average component cell. Such an approach must fall short of describing in full the growth of the organ if it assumes that tissue behaviour is no more than the summation of the behaviour of individual isolated cells. In a healthy tissue the constituent cells are always firmly attached to each other, and this attachment and any change in it are likely to be of great importance to the growth of the tissue.

Cohesion between parenchymatous cells can be considered in terms of the linking of primary walls, across the region occupied by the middle lamella. Two versions of this system are illustrated in the models 1 and 2 of Fig. 1, where the primary walls of adjacent cells are indicated by the lines *AA* and *BB*, and the intervening space represents the middle lamella, which is traversed by linkages. In model 1 the arrangement of the links is regular, at right angles to the two walls, and in model 2, the arrangement of the links is random. When the two walls expand the increase in area of the two surfaces is the same and would be represented by an increase in *AA* identical with that of *BB*. This increase could be brought about either by uniform expansion of the whole areas, or by an identical gradient of expansion in *AA* and *BB*. In model 1, the consequence of