mena such as thunderstorms and dust-storms particularly in the afternoons and evenings. The post-monsoon transitional months of October and November are also characterised by convective activity in the south of the peninsula.

The programme of work that has been undertaken comprises a detailed study of the diurnal variations of the fields of pressure, temperature and wind distribution over India and the associated effects on weather over the country.

NEW SWEET MAIZE HYBRIDS FOR THE NORTHERN PLAINS

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THE roasted or boiled green ears of maize are a popular snack in this country, particularly in and around the cities. For want of suitable sweet grained types, the green ears of flint grained varieties, normally cultivated in the country, are used for this purpose. If productive sweet grained varieties and/or hybrids can be developed, a significant contribution would be made to meet the demands of kitchen gardens and farmers located around the cities.

At present sweet maize is mainly cultivated in the Kashmir Valley, where mild temperatures during the growing season, are conducive to its culture. Tests conducted over several years, at the Indian Agricultural Research Institute, with sweet maize varieties from Kashmir and U.S.A., showed that these varieties are unadapted and hence unproductive in the plains and peninsular India. A project for developing such varieties, which could be profitably cultivated in these areas, was therefore initiated.

One recessive gene *su* is normally present in the commercial sweet maize, and is responsible for the development of sweetness in sweet maize kernels.[1] This gene prevents the conversion of a part of the sugar into starch. Though there are modifying factors,[2,3] the simple mode of inheritance of the major sugary gene *su* allows for its successful transference to a highly adapted and productive flint or dent variety. The normal procedure is to make a cross between a sweet maize and a flint or dent variety possessing desirable agronomic characters, and then carrying out the conventional back-crossing programme. In this manner, the *su* gene can be transferred into different genetic backgrounds. The resulting sweet grained segregates can then be used as follows: (1) if they are true breeding and productive, then the outstanding among them can be released as an open pollinated sweet maize variety; (2) inbred lines can be developed from them for the production of top performing double cross hybrids; and (3) suitable hybrids can be developed by crossing two such segregates which are genetically different but for the *su* gene.

Work along these lines was initiated at the IARI, in 1959. Two sweet maize varieties, Stowell's Evergreen and Golden Bantam, from the U.S.A., were each crossed to the adapted flint variety, Amarillo-de-Cuba (AdeC) from the Caribbean region, and the advanced generation of the semi-flint varietal cross KII × AdeC. The F_1 hybrids were selfed in 1960, and from these, four genetically different crosses, sweet-grained segregates were obtained. Next the procedure outlined under item 3 above was followed to develop two sweet maize hybrids. These two hybrids were tested in a replicated randomized trial in 1962, against the four parents, three other best sweet maize varieties available and KT 41, a popular flint variety. The yields obtained with regard to green ears and dry grain are presented below along with days to silk.

Name	Yield in Kilograms/Hectare		Days to Silk
	Green ears at milk stage	Grain yield at 15% moisture	
Hybrid No. 1 ..	8133	3715	48
,, 2 ..	5382	2561	46
Amarillo-de-Cuba (flint parent)	6219	3090	65
KII × Amarillo-de-Cuba (semi-flint parent)	7702	2921	53
Stowell's Evergreen (sweet parent)	5860	1669	48
Golden Bantam (sweet parent)	2643	1278	42
Golden 60 days ..	3719	1868	43
Extra Early Golden Bantam	2362	1458	40
Hawaiian Sugar ..	5130	2544	50
KT 41 ..	6051	2403	47
C. D. at 5% level ..	1520	658	..

Hybrid No. 1 significantly outyielded the two sweet maize parents and also the flint variety, Amarillo-de-Cuba at the green ear stage, while there was no significant difference when com-

pared to KII × AdeC. Hybrid No. 2 was only superior to the Golden Bantam parent. In grain yield, Hybrid No. 1 outyielded all the four parents, while Hybrid No. 2 gave significantly more yield than the two sweet maize parents. It will also be seen that Hybrid No. 1 was significantly better than the other entries. Moreover, it possessed one to two well-developed ears per plant which made very attractive roasted or boiled ears.

A test conducted for taste and sweetness placed the two hybrids at the top of the list. Another important character of the hybrids was their right maturity ; they flowered at the same time as the local variety, KT 41 and Stowell's Evergreen. Research is in progress to find out the range of adaptation of these hybrids in the country.

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INDUCED SPAWNING OF THE CHINESE CARPS *CTENOPHARYNGODON IDELLUS* (C. & V.) AND *HYPOPHTHALMICHTHYS MOLITRIX* (C. & V.) IN PONDS AT CUTTACK, INDIA

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Introduction.—The cultivated species of Indian carps (*Catla catla, Labeo rohita, Cirrhina mrigala*) and Chinese carps (*Ctenopharyngodon idellus, Hypophthalmichthys molitrix, Aristichthys nobilis ; Mylopharyngodon piceus*) are riverine species which normally breed only in flooded rivers during the monsoon months, May to July. They grow rapidly and attain sexual maturity in ponds but do not breed. Young ones required for stocking are therefore collected every year from natural sources. These collections are always fluctuating in quantity as well as quality and hence are often undependable. The need for a dependable method of pond breeding of these carps ensuring production and supply of quality fish seed has therefore been keenly felt in South-East Asia where these fishes are extensively cultivated.

Since 1957 a successful method of inducing the Indian carps (*C. catla, L. rohita, C. mrigala* and others) to breed in ponds in response to pituitary hormone injections has been developed in India and millions of fry of these fast-growing carps are now being produced every year by this method.[2,4,7,8,9,16] Though attempts have been made to breed the Chinese carps also in ponds by adopting similar techniques, they have not so far responded positively to the treatment.[5,12,17]

Chinese Carp in India.—With a view to find out the possibilities of utilising the Grass carp, *C. idellus*, for controlling rank growth of weeds in fish ponds and enriching the indigenous stock of cultivable species of fishes with fast-growing exotic forms experimental consignments of *H. molitrix* and *C. idellus* were introduced into India for the first time in 1959.[3] Within the next two years these fishes attained sexual maturity in ponds at Cuttack. During July 1962 experiments on inducing Grass carp and Silver carp to breed in ponds were successfully carried out. Three sets of Silver carps, two sets of Grass carps and a female Bighead yielded viable eggs after receiving pituitary injections. These eggs were fertilized and hatched and the young ones reared in ponds. This, to our knowledge, being the first successful instance of pond breeding of a Chinese carp, a brief resume of our observations is given in this contribution.

Size Attained.—Three years old, mature specimens of these carps ranged in size as shown in Table I.

TABLE I

Specimens	Sex	Length (cm.)	Weight (Kg.)
C. idellus ..	Male	75·2–86·0	4·54–6·61
	Female	73·8–79·2	4·76–7·03
H. molitrix ..	Male	62·5–71·0	2·80–4·96
	Female	63·5–81·2	4·99–7·49
A. nobilis ..	Female	67·2–70·3	4·76–6·00

***Breeding Techniques.*—Mature males of Silver carp and Grass carp were easily distinguished in the field by the marked roughness of the outer surface of the pectoral fins.[15] Freely**