

Table 1. The totals and percentages of bt kernels in the F₂ progenies of a₂ bt ga pr x various Mexican races (1961).

a) (a ₂ bt ga pr x Celaya)			b) (a ₂ bt ga pr x C.N.)		
Ear No.	Total kernels	% bt	Ear No.	Total kernels	% bt
-1	375	24.5	-1	394	32.0
-2	401	24.7	-2	334	28.1
-3	441	25.9	-3	348	29.3
-4	449	23.8	-4	328	30.8
-5	384	21.4	-5	282	30.5
-6	328	23.8	-6	368	22.8
	<u>2378</u>	<u>24.1</u>		2054	28.9
$\chi^2 = 1.13$ $P > .20$			$\chi^2 = 16.41$ $P < .001$		
c) (a ₂ bt ga pr x G. d.l. Virgen)			d) (a ₂ bt ga pr x Vandeño)		
Ear No.	Total kernels	% bt	Ear No.	Total kernels	% bt
-1	520	30.2	-1	415	37.1
-2	417	30.9	-2	455	27.3
-3	468	34.6	-3	431	29.3
-4	503	30.6	-4	399	28.8
-5	452	28.1	-5	398	28.1
-6	319	37.6	-6	377	30.2
-7	317	32.8		<u>2475</u>	30.1
	<u>2996</u>	<u>31.8</u>			
$\chi^2 = 74.08$ $P < .001$			$\chi^2 = 34.35$ $P < .001$		

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1. Sweet corn investigations.

a. Adaptation at the northern limit of maize cultivation. Sweet corn is the sugary seeded form of maize, and has been grown on a limited scale in Perthshire for some years. It is very sensitive to several external factors, particularly day-length, light intensity, soil temperature during germination and temperature prior to flowering. In addition the crop is readily attacked by the frit-fly (*Oscinella frit.*). Hence the growing of sweet corn in Eastern Scotland, which is at the most northerly limit of its cultivation by Man, affords interesting

opportunities for investigating the problems of adaptation, both environmental and genetical, in an outbreeding species.

The detrimental environmental factors can be controlled to some extent by improving the cultural conditions. Thus sowing in artificial heat reduces the failure to germinate, and use of soil blocks or whale-hide cartons in heated closed frames reduces attacks from frit-flies. Hybrid vigour in maize plays an important role in improving cold tolerance. It also introduces stability, or homeostasis, of the male and female inflorescences under conditions of long days and short nights. Hence a variety to be successful in Scotland must be highly heterotic. The two varieties I previously recommended for growing in England, viz., the F₁ hybrid North Star from New York State and the top-cross Canada Cross, a hybrid of Canada Gold variety with C 13 inbred, were considered most likely to be adaptable to conditions in Eastern Scotland (latitude 56 1/2° N). A "first early" F₁ hybrid Earliking from Minnesota, known to perform well over a wide range of conditions in the northern areas of North America, was also considered possibly to have adaptive potentiality.

It is furthermore recognized that all these strains should have a short maturity range. This means that they must have originated su mutations from the American Northern Flint (su) types and not from the dent types of maize (Cf. Haskell: *Genetica*, 28:308-314).

G. Haskell

b. Selection of a suitable variety for Eastern Scotland.

A trial at Dundee of Canada Cross, North Star and Earliking comprised 4 randomized blocks of paired rows with 10 plants per row, the plot being surrounded by a guard row. Spacing was at 1 ft. between plants and 2 ft. between rows. Seeds were sown singly in whale-hide pots on 16 May, and transferred to open frames on 25 May. Germination was over 96% for all varieties. The crop was planted out on 2 June. A single harvesting was made on 27 September. The percentage yield of marketable ears of each variety was: North Star 75, Canada Cross 68 and Earliking 59 ears. The low yield of Earliking was mainly attributable to severe plant damage from frit fly attack. It is not yet possible to predict a variety's reaction to this pest, which does not attack in North America and so has not been selected against. All the varieties suffered in having relatively poor tassels, but there was just sufficient pollination to provide reasonable seed setting. The quality of Earliking was excellent, and that of Canada Cross very good; but North Star rather lacked sweetness, although its ears were the most uniform.

Open pollinated ears of the earliest and best 8 plants in the plot were saved for seed. These comprised 6 ears from North Star and 1 each from the other two varieties. Their seeds have been mixed to form a new synthetic variety of polycross origin. It represents an initial selection for our local conditions, and it will be further selected in 1962.

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