5. Restorers found in College Yellow Flint and Eto synthetic (from South America).

In 1958, incorporation of male-sterile cytoplasm in Philippine standard inbred lines was started using F44T, introduced from Florida, U. S. A., as a source of T-sterile cytoplasm. Full and partial restorer lines were isolated. Philippine standard inbreds A104, A105, and A107a fully restored F44T in the single cross combination. After three backcross generations, experimental double-cross hybrids using the derived cyto-sterile inbreds and the natural pollen restorer inbreds were made in the 1960 off-season planting.

The comparative yield trial of these restored and cyto-sterile hybrids and their normal counterparts was done in the 1960 Wet Season (May planting) and 1960-61 Dry Season (October planting). During these seasons' test at College, the restored cyto-sterile Philippine hybrid 1d [(A111T x A113N)(A106T x A107aRf)] exhibited a very acceptable 44% and 66% pollen production in the 1960 Wet Season and 1960-61 Dry Season, respectively.

Degree of pollen restoration in Philippine cyto-sterile hybrids.

Entry 1/	Pollen Fertility 2/ %	
	Wet Season	Dry Season
Philippine Hybrid #1d		
(A106 x A107a)(A111 x A113)	100	100
(A11T x A113N)(A106T x A107aRf)	44	66
Philippine Hybrid #3b		
(A102 x A106)(A112 x A113)	100	100
(A106T x A102N)(A112 x A113)	14	21
Philippine Hybrid #5		
(I83 x A113)(A102 x A103) 3/	100	100
(A102T x A103N)(I83 Rf x A113)	36	51
Philippine Hybrid #7		
(I18 x I80)(A102 x A106) 4/	100	99
(A106T x A102N)(I18 x I80Rf)	19	46
Philippine Hybrid #2		
(L314 x L315)(A200 x A204)	100	100
(L314T x L315N)(A200 x A204)	2	45

1/ - Rf = restorer
T = Texas cytoplasm
N = Normal, Non-restorer

2/ - Includes partially fertile plants

3/ - I83 was derived from Eto - 185-1-#-# obtained from South America through the Rockefeller Foundation

4/ - I80 was derived from Eto-13A-1-#-#-#.

In all cases, higher percentages of pollen restoration were obtained during the Dry Season than during the Wet Season. The low night temperatures in December, when the plants tasseled, probably enhanced the pollen production of the restored sterile hybrids.

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1. Continued study of defective WF9 cytoplasm.

Further breeding studies of the apparently defective cytoplasm discovered in an open-pollinated plant of WF9 (Duvick, 1958 Coop News Letter) have indicated that the degree of expression of the aberrant cytoplasm is influenced by the genotype. The original open-pollinated aberrant plant was selfed four times, giving rise to a relatively uniform, viable line of "wsp" phenotype (pale green streaks in the leaves, especially at about the 5 - 7 leaf stage, accompanied by some loss of vigor). In each generation the selfed plant used to propagate the stock also was backcrossed as male to a stock which was originally normal WF9. This has produced a line approaching the general phenotype of the selfed stock in all respects except that no plants have shown any wsp characteristics, and the backcrossed line, although uniform, is considerably more vigorous.

When the wsp line, after four selfs, was crossed reciprocally to four normal inbred lines (Os 420, WF9, M14 and SK2) all crosses with wsp as female showed wsp in some but not all plants of the single cross. The reciprocals in no case had any wsp plants. When the single crosses with wsp as female were backcrossed (as female) to the normal inbred lines, or selfed, wsp plants occurred in the backcross and F_2 progenies, with varying degrees of expression. The progenies involving Os 420 and WF9 showed a much higher percentage of wsp plants than did those involving M14 and SK2, in both the F_1 and the advanced generations. Some wsp plants in the advanced generations of the cross of the wsp line and WF9 greatly exceeded the parent wsp line in degree of expression of wsp. Each of the original F_1 crosses described above was made in duplicate and in all cases the degree of wsp expressed was more similar within progenies involving the same normal inbred line than between progenies involving different inbred lines.

The present plan is to continue backcrossing the four stocks to the respective normal inbreds until four reasonably homozygous stocks, in wsp cytoplasm, are obtained. These will then be used for further genetic studies of effect of the genotype on expression of wsp, as