

II. REPORTS FROM COOPERATORS

ALLEGHENY, NEW YORK

Maize “super leafy”

— Karl, JR

A strain was created by placing the “Leafy” mutation into the tallest tropical maize of the subspecies, to show the fullest effect of the mutation in concert with the extreme short-night reactivity of the natural background (Karl, MNL 86:4, 2012). In the third back-cross generation (2012; now 93% tallest background), one of at least eight plants had 76 leaves (New York; a new subspecies maximum), 40 of which were above the ear tab (Fig. 1). The other plants were ~9.15 m tall, two of which had ear shoots (one of them permitted to silk) at 6.1 m/leaf 31 and eight leaves below the tassel. The 76-leaf plant had a normal, undeveloped tassel (22 cm) and was permitted to reach a height of 10.3 m. Forty leaves perchance represent the extreme expression. The 76-leaf plant and the other plants were cultivated in the ground of a tall greenhouse in New York (seasonal short night) with artificial short night of constant length (natural, decreasing night length until the summer solstice when the termini of the day (sunrise, sunset) were set at those seasonal extremes, plus a three-hour midnight light exposure). Plants were covered with two layers of (4 mil) opaque plastic sheeting to extend the night length.

In addition to the short-night plants, 14 more of that generation were cultivated in the field and given 68 consecutive 13-hour-long nights beginning when the fifth leaf tip began protruding from the whorl (crotch of previous two leaves). When the long-night treatment ended (the first short night being June 20, summer solstice), the plant height was 1.38 m, 23.5 leaf tips were protruded, 17 leaf collars were protruded on the (pure Chiapas 234) short-internode version of the strain, and 15.5 leaf collars were protruded on the (25% Montana race accession Ecuador 689) long-internode version. Later, five of the 14 plants exhibited leafy, having 12.5 leaves above the ear (20 below), except for one plant whose leaf quantity was greater — so much greater that the quantity could not be determined when the whorl was dissected at the time of comparison to the four normal leafy plants whose tassels were fully protruded (a *delayed flowering* N2461 x tallest tropical F2 mutant had 6-8 leaves above the ear and 18.5 below, 24-27 total; the wild type had 18.5 total).

The odd cases of extreme leafy happen less frequently than the *Leafy* mutation, but with a frequency more similar to that of short-night leafy (the etiology of short-night leafy has presumably been a difference in critical night length between the ear and tassel meristems such that a certain night length is registered by the lateral meristems as a long night, thus causing ear initiation; yet, that same night length is registered by the apical meristem to be a short night and thus permits the apical meristem to continue manufacturing leaves). However, both the *Leafy* mutation and short-night leafy evoke a moderate and ostensibly equal quantity of leaves above the ear (~10-20), unlike the extreme case (“super leafy”). Thus, super leafy may be the additive result of the *Leafy*

mutation + short-night leafy ($1/2 \times 1/4 = 1/8$ frequency; $6 + 17 + 17 = 40$ leaves above ear). The *Leafy* mutation may delay tassel initiation enough so that the 68 13-hour nights are inadequate to prevent short-night leafy. Thus, there are two doses of leafy.

In the literature, there have been discrepancies over whether “indeterminate” is i) present in a wild-type form in some (e.g. racy tropical) varieties; ii) inactivated by greenhouse cover (filtration of UV wavelength); and iii) night-length dependent. Perhaps some events of the wild-type indeterminate have been short-night leafy, as the *indeterminate* mutation rarely indicates ear position.

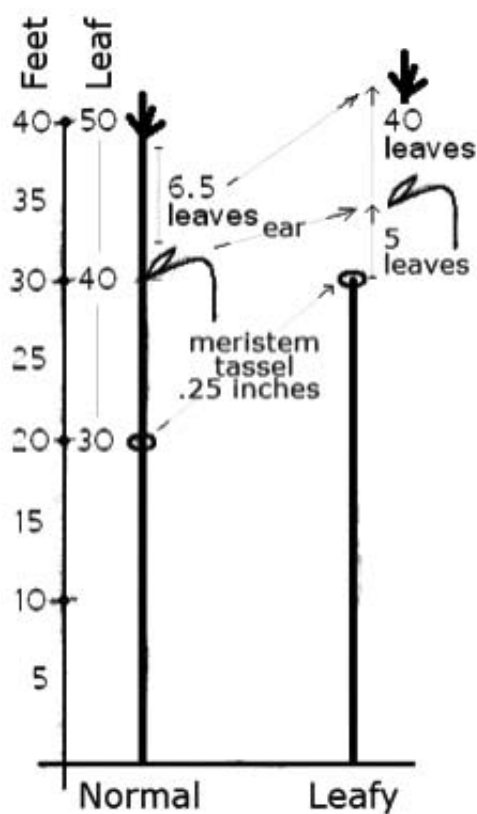


Figure 1. Organ location in the tallest maize of the subspecies Chiapas 234 + Leafy.

BERGAMO, ITALY

Consiglio per la Ricerca e la sperimentazione in Agricoltura
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Resistance to *Fusarium verticillioides* and total antioxidant capacity in Italian maize varieties

— Alfieri, M; Torri, A; Balconi, C; Lanzanova, C; Locatelli, S; Valoti, P; Redaelli, R

The market of maize-based foods has recently faced a quick expansion, mainly due to the need to prevent or reduce food al-