References and Notes

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New Source of the j_2 Gene Governing Jointless Pedicel in Tomato

Abstract. A multiple-flowered, jointless pedicel, single plant appeared in the tomato variety 146 in 1958. The gene governing the jointless pedicel character was found to be identical with the j_2 gene found in a tomato strain from the Galapagos Islands. The character is considered to be a mutant and of potential value in the development of mechanically harvestable tomatoes.

An off-type, single plant of the tomato variety 146 (*1*), with multiple flower clusters, was found in a commercial field in 1958. Plants grown in 1959 from seed of this plant produced flower clusters with jointless pedicels. The clusters were bifurcate, differing from those of plants with the j_1 gene (*2*). They were similar in appearance to the jointless pedicel clusters of strain LA 315 received from C. M. Rick. Strain LA 315 was derived from LA 166, a collection of *Lycopersicon pimpinellifolium* from Indefatigable Island of the Galapagos Island group (*3*). The jointless pedicel character of strain LA 315 was reported by Rick to be different from that determined by the gene j_1 and was assigned the symbol j_2 (*3, 4*). As far as we know this has been the only report of the j_2 gene.

A series of crosses was made between the 146 selection and normal jointed, jointless j_1 type, and jointless j_2 type, using LA 315 for the last cross, with the results shown in Table 1.

Crosses 1, 2, and 3 indicated that 146 selection pedicel type was recessive to normal jointed, was conditioned by a single factor, and was like j_2 pedicels in appearance. Crosses 4, 5, and 6 indicated that 146 selection was not identical with jointless j_1, because the F_1 was jointed, both jointless types appeared in the F_2, and the two backcross populations were distinct, each approaching 1 : 1 ratios for jointed and jointless, with the backcross parent pedicel type only represented.

Crosses 7, 8, and 9 established the identity of the j_2 gene for jointless pedicel in 146 selection and LA 315, with all populations having j_2 pedicels.

In contrast with clusters of 1 to 6 flowers in most j_1 tomato strains or varieties, the j_2 clusters, as grown at Riverton, New Jersey, have from 7 to 30 or more flowers per cluster, although actual fruit set is usually 1 to 4 per cluster. The 146 selection differs from LA 315 in lacking the large and leaflike calyces and the ovoid fruit described for the latter (*3, 4*). The character behaves normally in crosses and has been combined with both determinate, *sp* and dwarf, *d* characters and with the double recessive, *d, sp*. Germination of seed is normal.

The jointless pedicel character results in a minimum of stems remaining on picked ripe fruit. This characteristic may be useful in the development of mechanically harvestable tomato varieties (*5*).

The origin of the j_2 character in 146 is unknown. The LA 315 j_2 was not grown in local experimental plantings until 1960, whereas the 146 selection appeared in 1958. This eliminates the possibility that a chance field pollination from LA 315 introduced the gene to the 146 variety.

Table 1. Classification of tomato plants for pedicel type.

Cross	Parent plants	Generation	No. of plants of phenotype: Jointed	Jointless j_1 type	Jointless j_2 type
1	146 sel. × Jointed	F_1	11	0	0
1	146 sel. × Jointed	F_2	72	0	16
2	146 sel. F_1 × Jointed	BC1	41	0	0
3	146 sel. F_1 × 146 sel.	BC1	12	0	10
4	146 sel. × Jointless j_1	F_1	6	0	0
4	146 sel. × Jointless j_1	F_2	18	3	1
5	146 sel. F_1 × Jointless j_1	BC1	13	7	0
6	146 sel. F_1 × 146 sel.	BC1	12	0	10
7	146 sel. × LA 315 j_2	F_1	0	0	4
7	146 sel. × LA 315 j_2	F_2	0	0	46
8	146 sel. F_1 × 146 sel.	BC1	0	0	21
9	146 sel. F_1 × LA 315 j_2	BC1	0	0	22

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Sources and Isotopic Composition of Atmospheric Sulfur

Abstract. In nonindustrial areas the prime source of SO_4^{--} in rain and snow is atmospherically oxidized H_2S that is produced predominately along coastal belts by anaerobic bacteria. The δ S^{34} analyses of atmospheric SO_4^{--} vary from +3.2 to +15.6 per mil in contrast to +20.7 per mil for sea water SO_4^{--}. Contrary to previous studies based on Cl^-/SO_4^{--} ratios, sea spray SO_4^{--} is a minor source.

Studies on the relationship between variations in isotopic composition of sulfur and the genesis of sulfide minerals (*1*) have led us to encounters with the complexities of the biogeochemical cycle of sulfur. One significant portion of this cycle is the role of sulfur in the atmosphere.

Sulfur occurs in the atmosphere predominately, if not exclusively, as SO_4^{--} in aerosols and in SO_2 and H_2S gas. The second form, and in all probability the third, is oxidized to SO_3, which in the presence of moisture subsequently forms hygroscopic SO_4^{--} nuclei. The SO_4^{--} in aerosols is returned to the earth in precipitation of rain and snow—in variable concentrations between essentially 1 to 10 mg of SO_4^{--} per liter of precipitation.

Three sources for SO_4^{--} in the atmosphere have been suggested. The first and most obvious source, especially to urbanites, is industrial SO_2, which, as shown by Junge (*2*), is certainly quantitatively insufficient to account for the total amount of SO_4^{--} in the atmosphere. The second source is H_2S produced by anaerobic