

REPORT OF THE TOMATO GENETICS COOPERATIVE NUMBER 26 FEBRUARY 1976  
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FOREWORD

The Tomato Genetics Cooperative is a group of workers who have a common interest in tomato genetics and who are organized informally for the purpose of exchanging information and stocks. Participation is voluntary, and costs of activities are met by assessments to members.

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As of December 31, 1975, TGC membership was 318 and the financial balance, \$1139.06.

The annual meeting was held in San Francisco, February 4, 1975 in conjunction with the Tomato Breeders Round Table. Minutes appear below. Arrangements have been made to meet again with the TBRT in 1976 at their sessions in Indianapolis.

It is our lamentable duty to report the passing of Dr. Kay Verkerk in August, 1975. A TGC stalwart, Kay will long be remembered for his extensive contributions, particularly for the induction of many useful tomato mutants and for his generosity in sharing these research materials.

This issue has the usual sections. As announced in the October Newsletter, we intended to include revised linkage maps. The Canadian mail strike and Len Butler's current leave in Australia thwarted these plans, but we hope the revised maps can be prepared for TGC 27.

Once again it is our privilege to acknowledge the talented and willing labor that resulted in the creation and mailing of TGC 26. Once again Dora Hunt assumed full responsibility for memberships, financial accounts and the management and editing of this Report. Marta Hurtado typed the master copies and ion Fobes and Carole Meredith assisted with proof reading. To them and other capable assistants who helped with TGC 26 we express our deep appreciation.

Coordinating Committee

L. Butler	C. M. Rick, Chairman
S. Honma	Department of Vegetable Crops
G. B. Reynard	University of California
R. W. Robinson	Davis, California 95616

ANNUAL MEETING

The 1975 meeting of the Tomato Genetics Cooperative was held under the auspices of the Tomato Breeders Round Table in Hotel San Franciscan, San Francisco, California, February 4, 1975 at 4:30 p.m. C. M. Rick presided. A large group was present at the meeting. Although it was impossible to ascertain the number of TGC members attending, the attendance by members was certainly good, as it usually is in conjunction with the TBRT.

A brief review of TGC activities for the past year was presented by the chairman. As of December 31, 1974, the financial balance was \$966.49 and membership stood at 318.

In the absence of any other business and in anticipation of free cocktails at the subsequent happy hour, the meeting was adjourned without dissent.

C. M. Rick, Secretary pro tem.

PART 1  
RESEARCH NOTES

Atanassova, B. Inheritance studies on some components connected with exerted stigma in tomatoes and the influence of different environments on its manifestation.

Studies were carried out in diallel cross 8 x 8 involving the following tomato lines, cultivars and species:  
GCR-66, Rutgers 21, Red cherry, Penelopa, Line 7/3,

Line XXIV-13, *L. hirsutum* f. *glabratum*, *L. pimpinellifolium* No. 108 (Table 1).

Four flower parts controlling the manifestation of exerted stigma were measured: filament, anther, style and ovary. For studying the influence of different environments, the measurements were made according to clusters (from 1st to 5th), and trials were carried out under field and glasshouse conditions in 1974 and 1975.

It was shown that except the hybrids involving the wild species *L. pimpinellifolium* No. 108 and *L. hirsutum*, the filament and the ovary practically did not play any part in the manifestation of exerted stigma, showing intermediate inheritance. Therefore, first consideration was given to anthers and style. The inheritance of these two components in F1 was studied by means of the genetic parameters for dominance and additivity (Falconer 1960).

Table 1. Mean values for the components connected with exerted stigma in the parental forms involved in the diallel cross.

Parental	Filament length mm	Anther length mm	Style length mm	Ovary length mm
GCR-66	1.44	8.15	12.31	1.33
Rutgers-21	1.45	8.26	10.50	1.60
Red cherry	1.37	6.42	7.25	1.53
Penelopa	1.11	8.22	5.11	1.15
Line 7/3	1.38	7.30	6.30	1.84
Line XXIV-13	1.39	9.25	7.09	1.51
<i>L. hirsutum</i> f. <i>glabratum</i>	1.86	7.53	10.20	1.02
<i>L. pimpinellifolium</i> No. 108 (origin Peru)	1.39	7.91	10.26	1.06

Table 2 contains data about the inheritance of anthers and styles in F<sub>1</sub> hybrids between long-styled forms and forms with the style below the anther cone.

Table 2. Inheritance of anther length and style length in F<sub>1</sub> hybrids involving XXIV-13, Penelopa and 7/3.

Hybrid	A n t h e r s				S t y l e			
	F <sub>1</sub> mm	M mm	d	d/a	F <sub>1</sub> mm	M mm	d	d/a
Rutgers-2-1 x XXIV-13	8.76	8.76	0	0	8.39	8.80	-0.41	-0.240
Rutgers-2-1 x Penelopa	9.14	8.24	0.90	45.00	8.85	7.81	1.04	0.385
Rutgers-2-1 x 7/3	7.24	7.78	-0.54	-1.13	7.30	8.40	-0.90	-0.429
GCR-66 x XXIV-13	8.55	8.70	-0.15	-0.273	10.31	9.70	0.71	0.272
GCR-66 x Penelopa	8.89	8.18	0.70	10.00	10.10	8.71	1.39	0.385
GCR-66 x 7/3	7.64	7.73	-0.11	-0.260	8.39	9.31	-0.92	-0.291
Red cherry x XXIV-13	7.59	7.84	-0.25	-0.176	8.22	7.18	1.04	13.000
Red cherry x Penelopa	7.99	7.32	0.67	0.744	7.74	6.18	1.56	1.460
Red cherry x 7/3	6.98	6.86	0.12	0.273	6.84	6.78	0.06	0.125
XXIV-13 x <i>L. pimp.</i>	8.64	8.58	0.06	0.089	10.00	8.68	1.32	0.830
Penelopa x <i>L. pimp.</i>	8.81	8.07	0.74	4.625	9.76	7.69	2.07	0.802
7/3 x <i>L. pimp.</i>	8.04	7.61	0.43	1.387	8.87	8.28	0.59	0.298
XXIV-13 x <i>L. hirsut.</i> f. <i>glabrat.</i>	9.23	8.39	0.84	0.976	9.90	8.65	1.25	0.800
Penelopa x <i>L. hirsut.</i> f. <i>glabrat.</i>	8.98	7.88	1.10	3.143	9.61	7.65	1.95	0.765
7/3 x <i>L. hirsut.</i> f. <i>glabrat.</i>	8.78	7.41	1.30	10.833	9.55	8.25	1.30	0.667

The line Penelopa rectifies the exerted stigma in hybrids involving Rutgers, Red cherry and *L. pimpinellifolium* No. 108 and the line 7/3 in all hybrids. The exerted stigma is considered rectified when the style extends beyond the anthers by no more than 0.5 mm. The data presented in Table 2 show also that Penelopa rectifies the exerted stigma thanks to the manifestation of heterosis for anther length in F1 hybrids, and the Line 7/3, thanks to the style: the d/a values for the hybrids involving the Line 7/3 are lowest compared with those of the remaining hybrids. This suggests that the choice of the male parent should not be based on the absolute style-length value nor on how much is the style below the anther cone, but one should make crosses for detecting lines or cultivars similar to 7/3 or Penelopa and rectifying the exerted stigma.

The comparison between field and glasshouse data suggests that in most of the parents and hybrids an increase of style exertion is observed in the glasshouse, except in *L. hirsutum* f. *glabratum* and some of its hybrids. This increase varies between 0.10 and 1.10 mm and results both from decrease of the anther length and increase of the style length, the greater part of the difference being attributed in many cases to the anthers. Generally, the anthers show a clear tendency toward shortening under unfavourable conditions, which is absent only in *hirsutum* f. *glabratum* and Penelopa, the latter being the result of remote hybridization between *L. esculentum* and *S. Pennellii*.

No regularity in lengthening of the style under unfavourable conditions was revealed; lengthening was observed in several cases, but many cases with practically unchanged style length were also observed.

Daskaloff, Chr., M. Konstantinova and I. Georgieva Influence of pollen with gamma rays upon germination percentage of fruit setting and crossability in tomato.

Investigations on the influence of irradiation of pollen with gamma rays are being made in several directions: establishing the percentage of germination of pollen on the 3<sup>rd</sup> hour after placing it in nutrient medium, cytological studies on

germination of irradiated pollen upon the stigma, the influence of irradiated pollen on the percentage of fruit setting and fruit seeding in crossing, the influence of irradiated pollen for improvement of crossability in interspecific tomato crosses.

The results on the 3rd hour after placing of pollen for germination were that the gamma irradiated pollen germinated while the control pollen showed lower percentage of germination or no germination at all.

The cytological observations made with a fluorescent microscope showed a clearly expressed enhancing effect of the irradiation of pollen with gamma rays.

The percentage of crosses setting fruits at pollination with pollen treated with gamma rays in all crosses was higher than controls. The difference between the two variants had significance of first range. Substantial differences were not noted on the seeding and 1000 seed weight (Table 1).

The cross Comet x *L. cheesmanii typ.*, between the two species of the genus *Lycopersicon*, studied by us, which in our conditions showed 40-55% fruit setting, when using irradiated pollen for crosses showed a considerable increasing of crossability between them.

Analogical results were obtained in the cross with the species *L. hirsutum f. glabratum*. The work on overcoming the incrossability by pollen irradiation is going on.

Table 1.

Variants	Greenhouse 1974/75				Field 1975			
	Crosses made	Fruit set no.	%	Ave. seed no.	1000 seed weight	Crosses made	Fruit Set no.	%
<b>Comet</b>								
x <i>L. Cheesmanii typicus</i>								
Control	102	56	54.7	59	2.44	172	76	44.2
Pollination with irradiated pollen	102	82	80.4	52	2.45	164	138	84.1
<b>Bison</b>								
x <i>L. hirsutum f. glabratum</i>								
Control	74	28	37.7	58	-	-	-	-
Pollination with irradiated pollen	74	46	62.5	72	-	-	-	-
<b>N. 10</b>								
x Bison								
Control	81	50	61.7	54	-	100	60	60.0
Pollination with irradiated pollen	86	61	70.9	72	-	77	52	67.5

Daskaloff, Chr., M. Konstantinova, and K. Moinova Inheritance of lycopin content in tomato fruits of diallel cross.

In connection with our breeding program for high quality of tomatoes, analyses of species, varieties and F1 hybrids in the diallel cross 6 x 6 were made.

The results of the analyses made showed that *hp/hp* and *L. cheesmanii typicus* had the highest content of lycopin (Table 1).

In Table 2 the values of the relationship between the dominant and additive parameter (d/a) are given for every F1 combination.

In most cases this relationship was higher than zero and lower than one, showing incomplete dominance of one of the parents. Only in some crosses d/a was equal to one or a little more than one and that showed dominance. The direction of dominance was different.

Table 1. Lycopin content.

Variety, species	Violet	Caro red	hp/hp	Moneymaker	Druzba	<i>L. cheesmanii</i> typ.
Violet	6.209	3.399	5.609	3.724	5.546	7.894
Caro red		1.777	2.838	3.545	2.622	2.384
hp/hp			9.006	5.106	4.574	8.137
Moneymaker				4.480	5.214	8.275
Druzba					5.832	8.473
<i>L. cheesmanii</i> typ.						7.998

Table 2. Estimation of F<sub>1</sub> by d/a.

Variety, species	Violet	Caro red	hp/hp	Moneymaker	Druzba	<i>L. cheesmanii</i> typ.
Violet		-2.68	-1.43	-1.87	-2.52	0.88
Caro red			-0.71	0.31	-0.58	-0.85
hp/hp				-0.72	-1.79	-0.72
Moneymaker					0.09	1.16
<i>L. cheesmanii</i> typ.						1.44

Dorossiev, L. New possibilities for using sterility *ps* John Baer in hybrid seed production of tomato. [Submitted by C. Daskaloff]

In crossing line 159 and line 160 (Dorossiev, TGC 25, 1975) the new line No. 180 (*sp, c, ex, ps, aw*) was obtained. In this

line, because of the nearly full absence of growing together between the petals and anthers and the action factors *ex*, the stigma is early accessible for pollination, and the presence of two recessive genetic markers *c* and *aw* allows the elimination of eventual impurities from self-pollination which in our experiments turned out to be lower than 0.2%. Besides, the volume of work in BC is reduced several times because of the strong linkage of the genes *ps* and *aw*, and that allows in BC in F<sub>2</sub> to flowering to grow only anthocyaninless plants, which represent 25% of the whole material and nearly all of them are sterile.

These peculiarities of line 180 make it very suitable for using in hybrid seed production in tomato.

Farley, J. D., W. L. George, Jr., and  
E. A. Kerr Resistant to *Botrytis*  
*cinerea*.

Material provided by E. A.  
Kerr (V543) was found to be  
resistant to *Botrytis cinerea*.  
Screening method was:

1) cauterize a small area of a fresh leaf scar of a 21-day-old plant with the tip of a hot wire, 2) apply to the wound a *Botrytis*-agar plug from a 7-day-old culture (potato dextrose agar), 3) place inoculated plants into a moist chamber in the greenhouse for 48 hours, and 4) evaluate disease severity 7 days after inoculation. *B. cinerea* was collected in Ohio from a greenhouse tomato stem lesion.

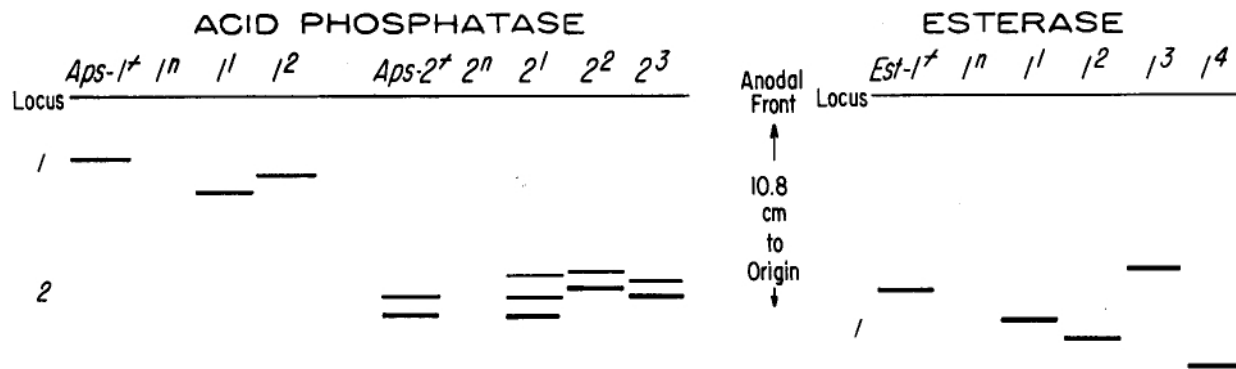
Susceptible lines (Ohio M-R 13 and Ohio W-R 25) usually collapsed within 3 to 4 days after inoculation. Resistant lines showed some tissue breakdown at the site of inoculation, but plants did not wilt and the small *Botrytis* lesion healed over.

Inheritance studies and tests with other isolates are in progress.

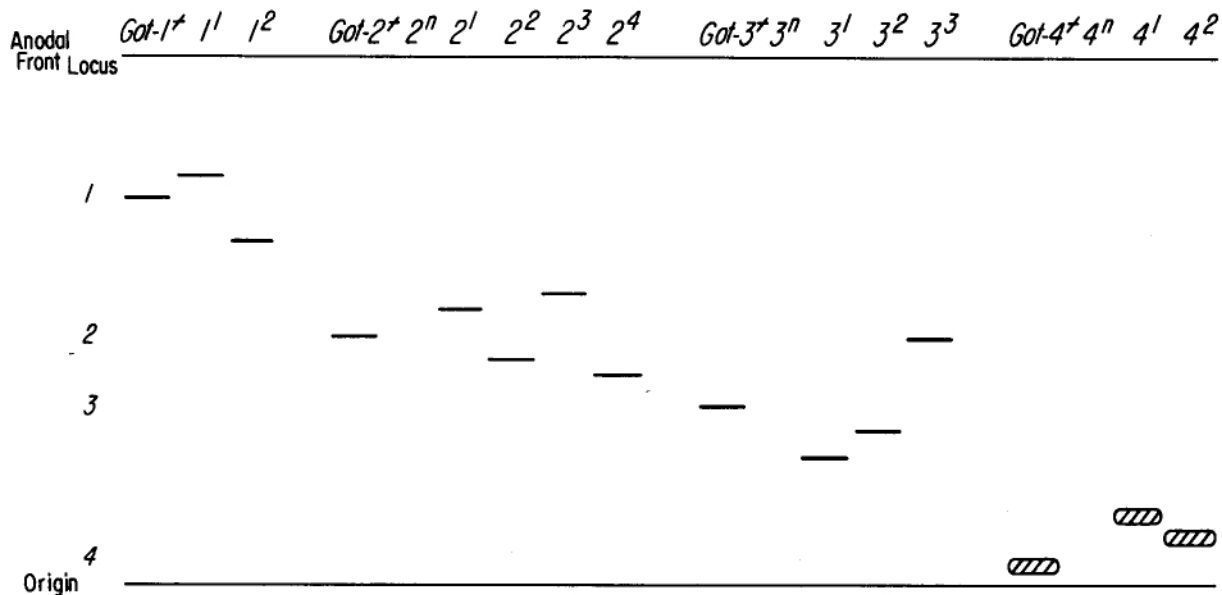
Fobes, J. F. and C. M. Rick  
*Aps*, *Est*, and *Got* phenotypes.

In our work on the isozymes  
of these three enzyme systems  
in red-fruited and closely

allied tomato species, we have found it necessary to distinguish a number of allozymic variants. We assemble here the alleles that will appear shortly in various publications, as well as several additional key allozymes. They are named and symbolized in conformity with TGC rules with the minor exception that the first discovered allele is given the superscript (<sup>1</sup>). This exception was made in deference to the electrophoretic specialists because they mostly cannot comprehend a symbol without an allelic notation. The most characteristic phenotypic bandings as they appear in our gels, are represented in the diagrams below. The + (Marglobe) allele is represented on the left of each locus group. The mean distance between origin and anodal front is 10.8 cm.



GLUTAMATE OXALOACETATE TRANSAMINASE



Sources of these alleles are listed below.

Aps-1<sup>n</sup> LA397 *L. pimpinellifolium*  
 -1<sup>1</sup> *L. peruvianum* and nematode resistant *esc.* cultivars  
 -1<sup>2</sup> all tested *L. chmielewskii* and *parviflorum*

Aps-2<sup>n</sup> LA1450 *L. cheesmanii*  
 -2<sup>1</sup> San Marzano and other cvs.  
 -2<sup>2</sup> LA1405, 1407 *L. cheesmanii* v. *minor*  
 -2<sup>3</sup> LA1325 *L. chmielewskii*

Est-1<sup>n</sup> LA1578, 1585 *L. pimpinellifolium*  
 -1<sup>1</sup> widespread in *L. pimpinellifolium*  
 -1<sup>2</sup> common in Ecuadorean *L. pimpinellifolium*  
 -1<sup>3</sup> LA1617 *L. pimpinellifolium*  
 -1<sup>4</sup> all *L. chmielewskii* and *parviflorum*

Got-1<sup>1</sup> in all southern *L. pimpinellifolium*  
 -1<sup>2</sup> LA1659 *L. pimpinellifolium*

Got-2<sup>n</sup> LA1561 *L. pimpinellifolium*  
 -2<sup>1</sup> scattered in *L. pimpinellifolium*  
 -2<sup>2</sup> LA1450 *L. cheesmanii*  
 -2<sup>3</sup> all *L. chmielewskii* and *parviflorum*  
 -2<sup>4</sup> LA1583 *L. pimpinellifolium*

Got-3<sup>n</sup> LA1407 *L. cheesmanii* also in *L. pimpinellifolium*  
 -3<sup>1</sup> LA1464 *L. esc. v. cerasiforme*  
 -3<sup>2</sup> LA1578 *L. pimpinellifolium*  
 -3<sup>3</sup> in most *L. parviflorum*

Got-4<sup>n</sup> LA1247 *L. esc. v. cerasiforme*  
 -4<sup>1</sup> all *L. chmielewskii* and *parviflorum*  
 -4<sup>2</sup> LA1246 *L. pimpinellifolium*

Kerr, E. A., J. W. Potter and  
 Z. A. Patrick Linkage  
 relations of *Cf-2* and *Mi*.

Langford (Can. J. Res. C, 15:108-128,  
 1937) reported that *Cf-2* - the Vetomold  
 type of resistance to *Cladosporium*  
*fulvum* - was linked with *c* at a distance  
 of 43 crossover units.

His data also show 43.1 units between *Cf-2* and *j*. Gilbert (TGC 8:15-17,  
 1958) has shown that nematode resistance *Mi* is about 2 units from *yv* and  
 about 40 units from *c*. From these data it has been assumed that *Cf-2* and  
*Mi* are near each other on chromosome 6.

In 1962 we began a minor but continual experiment to combine these  
 economically desirable genes into one stock by growing up to 48 populations  
 twice a year. In the spring crop of 1972 we succeeded in getting a line that  
 was homozygous resistant for *Cf-2*. The following season a line homozygous  
 for both resistances was obtained. Small backcross populations with *rvt* and  
*c* were produced. Those that could be reliably scored for *Cf-2* and *Mi* gave  
 the results shown in the table.

<u>Gene Pair</u>	<u>Line</u>	<u>a</u>	<u>b</u>	<u>c</u>	<u>d</u>	<u>c.o.</u>
<i>Cf-2-Mi</i>	S75-273	15	4	3	23	15.5
	S75-274	11	0	2	9	9.1
	S75-276	18	1	1	21	4.1
	Total	44	5	6	53	10.1
<i>Cf-2-c</i>	S75-276	11	8	11	11	46.3
<i>Mi-c</i>	S75-276	11	8	11	11	46.3
<i>Cf-2-rvt</i>	S75-273	11	8	16	10	53.3
	S75-274	5	7	4	7	47.8
	S75-276	9	10	18	4	68.3
	Total	25	25	38	21	57.8
<i>Mi-c</i>	S75-276	11	8	11	11	46.3
<i>Mi-rvt</i>	S75-273	12	7	16	10	51.1
	S75-274	5	8	2	6	47.6
	S75-276	9	10	18	4	68.3
	Total	26	25	36	20	57.0
<i>rvt-c</i>	S75-276	18	13	6	8	42.2

The data indicate that *Cf-2* and *Mi* are about 10 units apart. They do not indicate the order since both of the crossovers in line S75-276 were *c*. Further tests with larger populations and markers nearer *Cf-2* - *Mi* are planned. The suggestion that *rvt* may be remotely located on the long arm of chromosome 6 is intriguing.

Pecaut, P. Search of *I/I* varieties without the gametophytic factor X.

M. P. Alexander (1973) has shown that in heterozygous *X/X<sup>+</sup>* plants, the micro-

gametophytes carrying *X<sup>+</sup>* abort. This abortion which reduces the quantity of pollen may be detrimental to a good fertilization, especially in bad conditions of pollen production. This defect is to be feared in the *I/I<sup>+</sup>* heterozygous fusarium resistant hybrids since most of them must be *X/X<sup>+</sup>*.

The existence of *I/I X<sup>+</sup>/X<sup>+</sup>* lines has not yet been reported. Beside their interest for the production of *I/I<sup>+</sup>* hybrids, such lines could be useful to combine *I* and other genes located on chromosome 11, as, for example, jointless or *I2*.

At first, we have checked pollen abortion of *I/I<sup>+</sup>* hybrids (which, consequently, were *X/X<sup>+</sup>*). Secondly we have looked for unaborted *I/I<sup>+</sup>* hybrids in order to detect *I/I X<sup>+</sup>/X<sup>+</sup>* parent lines. Our results indicate that the variety Campbell 1327 is *I/I X<sup>+</sup>/X<sup>+</sup>*.

Percentage of pollen abortion (aceto-carmin observation of pollen taken off the stamen 1 or 2 days before anthesis), mean:

**In the field, 1975;**

3 hybrids <i>I/I<sup>+</sup></i>	50%
2 hybrids <i>I<sub>4</sub>/I</i>	28%
2 hybrids <i>I<sub>4</sub><sup>+</sup>/I<sup>+</sup></i>	2%
1 hybrid <i>I<sub>4</sub><sup>+</sup>/I</i> ( <i>I</i> issued from Campbell 1327)	2%

**In glasshouse, 1975:**

a) Comparison between quasi-isogenic lines and their hybrids:

Marmande <i>I<sup>+</sup>/I<sup>+</sup></i>	5%
Marporum (= Marmande <i>I/I</i> )	4%
F <sub>1</sub> Marmande x Marporum	44%
Monita <i>I<sup>+</sup>/I<sup>+</sup></i> (and <i>Mi/Mi</i> )	3%
Mossol (= Monita <i>Mi/Mi</i> , <i>Ve/Ve</i> , <i>I/I</i> )	10%
F <sub>1</sub> Monita x Mossol	46%

b) 17 *I/I<sup>+</sup>* hybrids made with 17 different *I/I* lines (among them: Heinz 1370, Petomech, Merit, Red Rock, VF 90, Florida MH 1). Mean percentage of aborted pollen: 42%.

c) 3 *I/I<sup>+</sup>* hybrids made with Campbell 1327 or with 2 lines the fusarium resistance of which is issued from Campbell 1327. Mean percentage of aborted pollen: 4%.

Perez Lopez, F. A method of field hybridization. [Submitted by A. von der Pahlen] Under field conditions, particularly in summer or in tropical areas with low humidity, as in Trujillo, Peru,

the hot dry conditions induce the failure of many crosses on flowers that are enclosed in bags. Since 1965 we have eliminated the need for covering flowers, using instead the anther cone of the male according to the following method:

For the female parent:

- a) Select buds in which the corolla has not yet unfurled. Buds with corolla tips on the verge of separating at the tip are ideal.
- b) Separate the corolla segments so that they lie with the calyx. c) Cut each stamen longitudinally along its margin with the others and remove with forceps.

For the male parent:

- d) Select flowers that are completely open.
- e) Cut the base of the anther cone with nails of the thumb and index finger.
- f) Remove style from the cone with forceps.

For pollination:

- g) Place the cone obtained in step (e) as a cap over the pistil of the emasculated flower. Label.

Using this system, we have made intraspecific, interspecific, and intergeneric crosses. We made the interspecific cross *L. esculentum* x *L. pimpinellifolium*, using the latter as male parent, and the intergeneric cross *L. esculentum* x *Solanum agreifolium*, using the latter as male parent. Reciprocal crosses were not successful.

The time required per pollination using this method was one minute per cross, whereas with the use of bags it took from three to five minutes per cross. The degree of success with this method in various tests is presented below.

Cross	Efficiency
<i>L. esculentum</i> x <i>L. esculentum</i>	100% (tested in Castelar, Argentina and Perú)
<i>L. esculentum</i> x <i>L. pimpinellifolium</i>	100% (tested in Castelar, Argentina and Perú)
<i>L. esculentum</i> x <i>S. agreifolium</i>	50% (tested in Perú)

Quiros, C. F. High tolerance of the heterochromatic 2S•2S isochromosome.

Moens (TGC 13: 16-17, 1963; Can. J. of Gen. Cytol. 7:296-303, 1965) obtained the completely heterochromatic 2S•2S isochromosome as a derivative of a primary trisomic for the second

chromosome, the nucleolar chromosome, in the tomato. 2S•2S consists of a centromere flanked on each side by a short arm of chromosome 2, and lacks the satellites (reduced isochromosome according to Moens) but has the nucleolar organizer regions subterminally located.

High tolerance limits for 2S•2S chromosomes reported here were found after crossing a  $2n+3(2S\cdot 2S)$  plant with a ditertiary tetrasomic,  $2n+2(5L\cdot 7S)$ , described by Gill (Genetics 77:61-70; 1974). This cross originated a plant with four extra chromosomes of constitution  $2n+3(2S\cdot 2S) +1(5L\cdot 7S)$ . Selfed progeny of this individual produced two  $2n+4(2S\cdot 2S)$  plants. From three generations of selfing on these plants, selection for individuals with higher 2S•2S chromosome numbers made it possible to obtain plants with up to eight 2S•2S chromosomes. Since the original parental plants were of different genetic background (VF36 and San Marzano cultivars), the variability produced in the selfed generations expedited the selection response for tolerant genotypes for higher chromosome numbers.

The high tolerance of heterochromatic 2S•2S chromosomes suggests the use of the tomato as an ideal organism for investigating certain aspects of molecular cytogenetics. One extra 2S•2S chromosome adds two nucleolar organizer regions. Hence, it is possible to have plants ranging from two to 18 [ $2n+8(2S\cdot 2S)$ ] nucleolar organizer regions. The versatility of the 2S•2S chromosome system could prove advantageous in elucidating problems concerning nucleolar organization, ribosomal gene regulation, and other related phenomena.

Reeves, A. F. Elevated stomata of *h*.

The hairless mutant, *h*, located on chromosome 10, has been used

extensively for several years. It has been described as lacking the larger stem hairs. A close microscopic examination of its stems revealed that the multicellular bases of the large hairs are still present in approximately the normal frequency. Furthermore, at the apex of the multicellular base is found not the typical long trichome, but a fully developed stomatal apparatus. A paper reporting this discovery and including photomicrographs is in preparation.

In my present position I will not be able to pursue this further. I hope someone with the appropriate facilities will take an interest in following up on this developmental abnormality. Scanning EM pictures would be most helpful.

Reeves, A. F. Phenocopy of *e*, entire leaf.

Quite by accident in the spring of 1975 some Red Cherry seedlings were induced to develop entire leaves. Just as the seedlings

were emerging through the soil, the greenhouse in which they were growing was fumigated with pyrethrins in the form of a commercial product known as "Fog-a-Sect". Some extremely cold weather immediately following the fumigation prevented opening and airing out the greenhouse for a period of two to three weeks. During this time 100% of the Red Cherry seedlings (ca. 300) produced entire leaves. The phenocopy was so good that I was about to discard the flat, thinking I had planted the wrong seed; however, when the fourth and fifth true leaves developed (and subsequent leaves), it could be seen that these were indeed the normal Red Cherry seedlings. Some of these plants were transplanted to the field where they flourished normally and produced normal fruits.

The greenhouse fumigated with one can of "Fog-a-Sect" designed to cover 10,000 cubic feet encompassed about 2,500 cubic feet. Thus, while I do not know the actual concentration of pyrethrins, especially over the extended period of time, it was much greater than that recommended for white fly treatment.

Reeves, A. F. Tomato leaf extracts  
and thiamine-requiring mutants

Three years ago a study was  
initiated to explore the  
feasibility of working out

the pathway of thiamine synthesis in tomato with the use of the thiamine requiring mutants *tl* and *spa*. It was felt that by treating one mutant with the extract of another, and vice versa, the sequence of blocks could be established. Further, it might be possible to refine the extract to determine the active agent, and therefore, an intermediate in the pathway.

Our first step was to determine if an extract of normal tomato plants could be used to produce a response in thiamine-requiring mutants. Leaves of mature VF-36 plants (at least four months old) were ground in water with mortar and pestle and the extract concentrated by freeze drying. 18 grams of fresh tissue yielded 1 ml of extract. This extract was added to the cotyledons of *tl* plants at the cotyledon stage of growth, one drop twice a week for two weeks. Although the extract "burned" the cotyledons at the point of application, the plants did respond somewhat; that is, they became greener and grew somewhat faster than untreated controls. However, there was still marked chlorosis at a time when control *tl* plants treated with 100 ppm thiamine were fully green. At least there was a response that we could detect visually, and the method seemed feasible.

In our first experimental run, however, we had to use young seedlings for the extract of the mutants (they would die without thiamine treatment). Therefore, we also used VF-36 seedlings (one month old) for our control extract. Here we obtained the strange and unexpected results shown in the accompanying table. In less than two weeks all of the extracts had killed our *tl* test plants! At a time when untreated control *tl* seedlings were still limping along, many of the treated plants had turned brown and withered almost to the point of total decay.

**Table. Response of *tl* seedlings to extracts.**

Treatment	<u>Number of plants after 11 days</u>			
	Dead	Alive, no growth	Greening	Good growth
VF-36 extract (157 g - 4.6 ml)	2	1	4	
100 ppm thiamine				8
<i>spa</i> extract (264 g - 9.6 ml)	6			
water	1	7		
<i>tl</i> cotyledon extract (228 g - 10.2 ml)	7			
<i>tl</i> epicotyl extract (72 g - 5.2 ml)	2	5	1	
33 ppm thiamine				9
VF-36 extract (247 g - 7.6 ml)	9		3	

However, overzealous spraying with insecticides had interfered with the previous test, and we were not sure how many plants had been killed by extract, and how many by insecticide. A small re-test was set up in the following summer. An extract of three-week-old VF-36 plants (70.9 g - 3.7 ml) and one from six-month-old VF-36 (21.1 g - 0.8 ml) were compared directly. In 12 days the three *tl* test plants treated with the first extract died, while the four untreated *tl* plants were still alive. After 15 days the

three plants treated with the second extract began to turn green.

Several explanations came to mind: (1) The osmotic pressures of these extracts were much different (we did not measure osmotic pressure); (2) the stem and hypocotyl contribute something harmful to young *t1* plants (only leaves were used in the extracts of mature plants); (3) young tomato plants produce a toxic substance not found in older plants. We are not sure that these extracts will have any effect upon seedlings of normal genotype; only *t1* seedlings were used as test plants. I no longer have the time nor facilities to pursue these possibilities. Perhaps someone else will take an interest in solving this dilemma.

Reeves, A. F. Tomato-potato grafts.

Since the photosynthetic compensation temperature for

potato is much lower than that for tomato, potatoes do not survive through the Arkansas summer, whereas tomatoes do. It was felt that by grafting tomato scion on potato stock we would have a plant that could continue to produce potato tubers through the heat of the summer. In the summer of 1974 some 30-40 grafts onto field planted potatoes were attempted. Only two survived, and they did not grow. In the spring of 1975, potatoes were started in flats inside the greenhouse, and grafts established before transplanting to the field. Red Pontiac and Red Cherry tomatoes were the varieties used.

At the time of transplanting in early June, the tubers which had formed in the seed trays were removed, so that every tuber harvested on August 19 was formed during the summer months. As can be seen in Table 1, in spite of the fact that the grafted plants were also producing tomatoes in their upper parts, they slightly out-produced the ungrafted potatoes in both number and size of tubers. An even greater difference occurred in the % survival, with grafted plants (65%) doing much better than ungrafted (37%). These results, while only those of a single, small test, indicate that it is the foliage, not the tuber which is important in the inhibition of growth at high temperatures.

As a practical result, we can see from Table 2 that for the home gardener who has only a few plants in his summer garden, the chance of having a good tuber producing plant is greater with the grafted plants than with the ungrafted potatoes -- at least under the climatic conditions of north west Arkansas.

Table 1. Survival and tuber set on ungrafted potatoes and potato-tomato grafts.

	# trans- planted	# alive at harvest	# tubers set				total
			large	medium	small	very sm.	
Potato	38	14	0	3	4	15	22
Graft	20	13	2	3	8	15	28
Tomato	43	40					

Table 2. Comparison of tuber yields from individual plants for grafted and ungrafted potatoes.

	Number of plants with:		
	Moderate yield	Low yield	Little to no yield
Potato	3	7	4
Graft	6	6	1

Rick, C. M. New Combinations: *Ln-Wo<sup>m</sup>* and *hp-1p*.

Two new combinations of genes in our collection might be of more than ordinary interest.

Although synthesized out of purely idle curiosity, they have some unique characteristics.

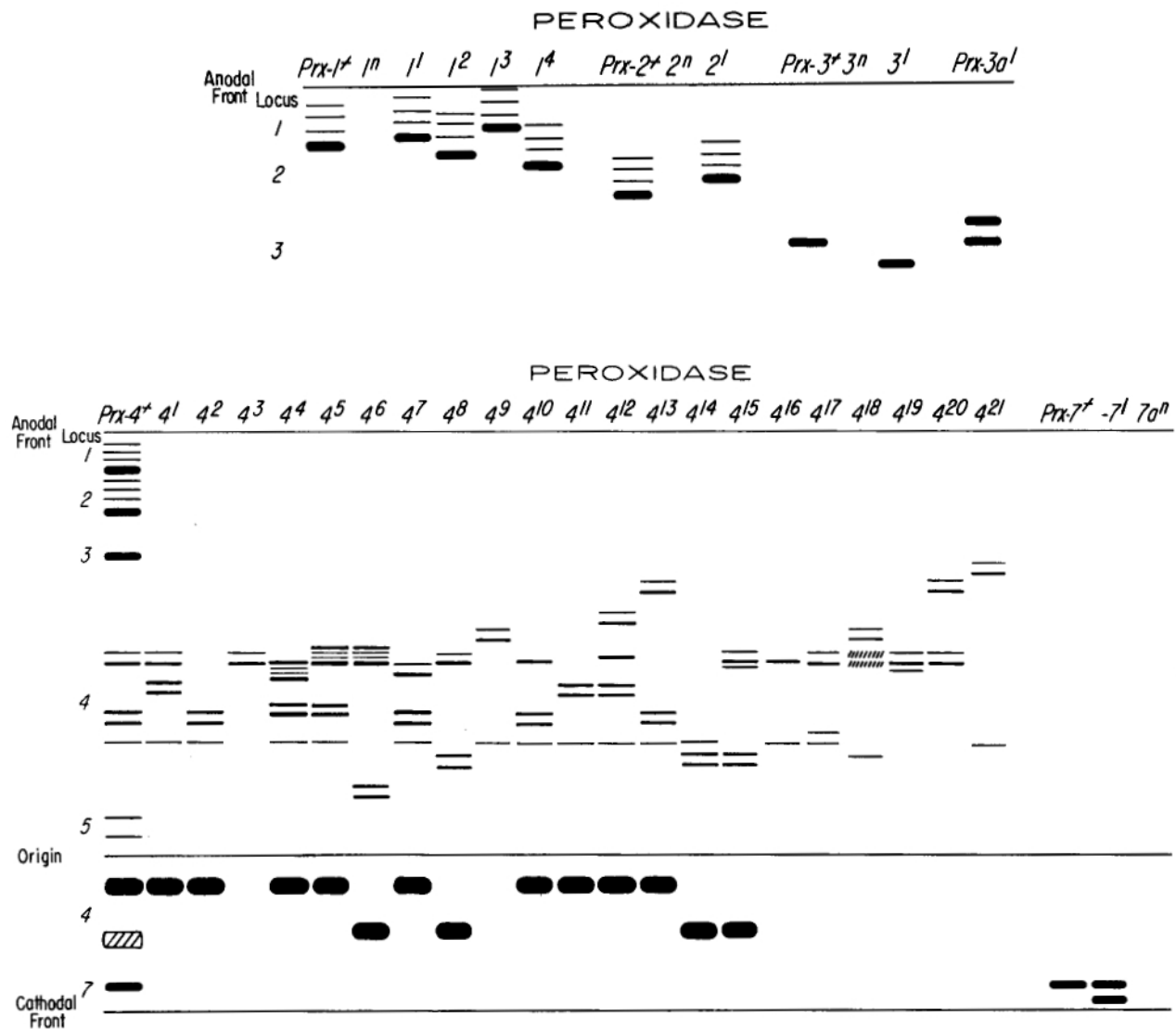
*Ln-Wo<sup>m</sup>* (LA1663). Since both of these genes augment the density of large trichome populations and are homozygous viable, I hybridized them to see what the combination might look like. Half expecting it to be weak or inviable like the more extreme *Wo* alleles, we were surprised to find it reasonably viable, although not of normal vigor. Fruitfulness varies, but we have been able to select variants that are more productive than others. The intensity of wooliness far exceeds that of any other line that we know and the white plants present a rather striking appearance. The formidable hairiness does not completely discourage horn worms or the pink potato aphid. We have not made any serious tests of resistance to these or other insect pests.

*hp-1p* (LA1664). The cross between *hp* and *Tp* -- the pigment intensifier derived from *L. chmielewskii* -- was made to test the genetic relationship between the two. Since they segregate independently in F<sub>2</sub>, it was possible to select for the double homozygote, which we obtained without difficulty. Unripe fruits of this combination are so dark in exterior color that they appear more black than green. The flesh of ripe fruits also appears very dark in color, although we cannot say that it appears darker to the eye than that of *hp*. This stock varies in vigor, many plants being more productive and having larger fruits than our other stocks of *hp*.

Rick, C. M. and J. F. Fobes  
*Prx* phenotypes.

This note is prepared to list in a single group peroxidase variants

from various sources in the same fashion as our summary of *Aps*, *Est*, and *Got* (see Note by Fobes and Rick in this Report). The diagrams below illustrate the most characteristic phenotypic bandings as they appear in our gels. The + (Marglobe) allele is represented on the left of each locus group. For purposes of clarification, the entire array of + *Prx* bands is shown on the left of the *Prx-4* series. The mean distance between origin and anodal front is 10.8 cm.



Sources of these alleles are listed below.

- Prx-1<sup>n</sup> sporadic in *L. cheesmanii* and *pimpinellifolium*  
 -1<sup>l</sup> widespread in *L. cheesmanii* and *pimpinellifolium* and Peruvian cultivars  
 -1<sup>2</sup> in few *L. pimpinellifolium*  
 -1<sup>3</sup> in few *L. pimpinellifolium*, all *chmielewskii* and *parviflorum*  
 -1<sup>4</sup> LA1028 *L. chmielewskii*  
 Prx-2<sup>n</sup> in few *L. cheesmanii* and *pimpinellifolium* -  
 2<sup>l</sup> sporadic in *L. pimpinellifolium*  
 Prx-3<sup>n</sup> rare in *L. pimpinellifolium*  
 -3<sup>l</sup> *L. chmielewskii* and *parviflorum*  
 Prx-3a<sup>1</sup> *L. chmielewskii*

- Prx-4*<sup>1</sup> widespread in *L. pimpinellifolium*  
*-4*<sup>2</sup> widespread in Ecuadorean cvs. and *L. pimpinellifolium*  
*-4*<sup>3</sup> sporadic in *L. pimpinellifolium*  
*-4*<sup>4</sup> *L. chmielewskii* and *parviflorum*  
*-4*<sup>5</sup> sporadic in *L. chmielewskii* and *parviflorum*  
*-4*<sup>6</sup> sporadic in *L. chmielewskii* and *parviflorum*  
*-4*<sup>7</sup> in few *esculentum* cvs.  
*-4*<sup>8</sup> widespread in *L. pimpinellifolium*  
*-4*<sup>9</sup> scattered in *L. pimpinellifolium*  
*-4*<sup>10</sup> rare in *L. pimpinellifolium* and *esc. v. cerasiforme*  
*-4*<sup>11</sup> LA1584 *L. pimpinellifolium*  
*-4*<sup>12</sup> LA1472 *L. pimpinellifolium*  
*-4*<sup>13</sup> sporadic in *L. pimpinellifolium*  
*-4*<sup>14</sup> common in *L. pimpinellifolium*  
*-4*<sup>15</sup> LA1610 *L. pimpinellifolium*  
*-4*<sup>16</sup> rare in *L. pimpinellifolium*  
*-4*<sup>17</sup> LA1580 *L. pimpinellifolium*  
*-4*<sup>18</sup> common in *L. pimpinellifolium*  
*-4*<sup>19</sup> LA1610 *L. pimpinellifolium*  
*-4*<sup>20</sup> LA1547 *L. pimpinellifolium*  
*-4*<sup>21</sup> LA1583 *L. pimpinellifolium*  
*Prx-7*<sup>1</sup> widespread in *L. pimpinellifolium*  
*Prx-7a*<sup>n</sup> widespread in *L. pimpinellifolium*

Schmidt, Hannelore Normalization of male-sterile mutants using gibberellic acid. [Submitted by R. Hageman]

The change of environmental conditions caused considerable variation in stamen characteristics of pollen-sterile mutants *ms-15*, *ms-26*, and *ms-33*

(comp.: following communication by V. Schmidt). Moderate field conditions as well as cultivation in the greenhouse seemed to promote the formation of external ovules.

Experiments using plant hormones have shown during recent years that sex expression could be influenced in some species, including some selected male-sterile mutants.

We attempted to normalize homozygous male-sterile plants of *ms-15*, *me-26* and *me-33* with gibberellic acid (GA<sub>3</sub>). The plants produced flowers with yellow pubescent stamens which fused to form a staminal cone. The best results were obtained with concentrations between 500-1000 ppm in the first method and between 125-500 ppm in the second method. By the first method, the solution was sprayed on three-week-old shoots. For the second method, the plants were allowed to suck in the solution over a piece of tissue cut out of the stem and dipped into a little glass containing the solution.

The highest level of normalization of the anther development of one to two inflorescences was observed five to seven weeks after the last treatment by the spray method or two to three weeks after the end of the treatment by the suck method and was maintained over a period of 10 to 14 days. The development of the external ovules was not fully suppressed in all cases, but enough fertile pollen grains could be harvested for selfing the phenotypically normalized stamenless flowers. Often the normalized flowers were able to form fruits with seeds without hand-pollination. The offspring were completely stamenless (comp.: Abstr. XII Internat. Botan. Congr., Leningrad

Schmidt, Volker Stamenless-like mutants with external ovules detected in the *ms* series. (Submitted by R. Hageman)

As reported, by Sawhney and Greyson, the mutant *sl-2* usually bears so-called external ovules (E.O.) outside the more or less reduced anthers.

Among the mutants of the *ms* series studied in detail in our laboratory, we found three mutants (*ms-15*, *ms-26*, *ms-33*) which more or less resemble a typical stamenless-mutant grown under Mid-European climatic conditions. The mutants behave as single recessives. The original background has been replaced partly by backcrossing with "Moneymaker". The three mutants are characterized by nearly normal development of calyx and corolla, but the anthers are much changed in size and shape. They are more or less degenerated, smaller than normal, and to some extent twisted or distorted. In control plants the anthers are laterally slightly joined to form a hollow cone, in the mutants they are grown together or coalesced with the pistil and the ovary respectively. All three mutants possess the remarkable feature of bearing naked external ovules outside (but rarely inside) the stamens. The number of them increases from a few to more than one hundred, depending on various conditions.

The number and extension of pollen sacs were influenced by the general reduction of anther tissues, and there was no evidence of their existence in extreme cases.

Although the three mutants are very similar, each has its own character, so that they can be distinguished from one another macroscopically.

The external ovules are very like the normal ones inside the ovary. Their development usually reaches the stage of macrospore differentiation. No evidence has been obtained up to now whether or not a fertilizable embryo sac is developed.

Steps of microsporogenesis identical to those described for the normal wild type were observed in the stamens as a rule. Microspores were partially produced, but most of them were found to be degenerated before anthesis.

Small amounts of viable pollen were formed, but as a rule not in amounts such that hand pollination is successful.

Tikoo, S. K., and A. B. Pal  
A spontaneous mutant with  
exserted stigma in tomato.

This mutant was observed in a naturally segregating population of variety Tip top (IHR-7) (*sp/sp,+u*) during evaluation of tomato germ

plasm collections at the Indian Institute of Horticultural Research, Bangalore. The exsertion of stigma was between 1 mm to 3 mm above the tip of the anther cone. The mutant was found to be breeding true for *ex* but segregated into *u<sup>+</sup>* and *u* fruit bearing plants. From these a homozygous genotype IHR 7-1-5 (*sp, u<sup>+</sup>, ex*) was isolated. On crossing this line with variety VF 36 (inserted stigma), the F<sub>1</sub> and the parents were raised in three replications and the position of stigma counted on ten flower clusters on each of five randomly selected plants per replication. The percentage of *ex* in 7-1-5 was 91.23 and of inserted stigma in VF 36 was 95.4. In the F<sub>1</sub>, 49.7 per cent flowers were observed to have varying degrees of exserted stigma while in the rest of the flowers the stigma remained at or near the tip of the anther cone. From this data, the inheritance of exserted stigma appears to be conditioned by varying degrees of dominance (Ognyanova, 1973) and may be governed by a few genes (Rick & Dempsey, 1969) rather than a recessive gene (Dorosiev, 1970)

which in the latter's case may be due to a difference in the genotype used. Detailed studies to work out the inheritance of the new mutant are being carried out as are also studies on the potential for utilizing this mutant for economizing hybrid seed production.

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Whalen, R. H. Linkage relations of singed.

The seedling mutant singed (*sn*) is similar to hairless (*hl*) in phenotype but has small, bent trichomes.

Lesley and Lesley (TGC 20:23-24, 1970) placed it on chromosome 5 on the basis of tests with *wt*, but there was considerable heterogeneity in their data, some families showing linkage and others not. This is not surprising in view of the frequently poor expression of *wt*. They found independence of *sn* with *tf* and only a weak linkage of *sn* with *mc*.

In our tests (see Table 1), we were unable to detect linkage of *sn* with the chromosome 5 genes *af* and *tf*. The low but significant chi-square for *sn-tf* is spurious, since the product ratio indicates 53.5% recombination for these two genes. Results were likewise negative with all other genes tested except *ah* on chromosome 9. The product method gives an estimate of 11% recombination between *sn* and *ah*.

Table 1. F<sub>2</sub> linkage data involving *sn*.

Tester mutant	<u>+</u> <u>+</u>	<u>+</u> <u>t</u>	<u>sn</u> <u>+</u>	<u>sn</u> <u>t</u>	<u>Total</u>	<u>Adjusted contingency chi-square</u>
<i>a</i>	301	107	106	30	544	0.7
<i>aa</i>	263	101	107	24	495	4.0*
<i>ae</i>	262	81	60	28	431	2.1
<i>af</i>	1932	551	536	180	3199	2.6
<i>ag</i>	578	188	154	35	955	2.7
<i>ah</i>	503	250	235	3	991	95.4**
<i>aw</i>	610	162	164	56	992	1.7
<i>bls</i>	314	94	102	20	530	2.1
<i>e</i>	372	130	114	36	652	0.1
<i>frg</i>	347	33	55	4	439	0.1
<i>ful</i>	176	61	54	17	308	0.0
<i>hy</i>	243	72	75	22	412	0.0
<i>sf</i>	521	141	153	48	863	0.5
<i>tf</i>	1461	415	400	146	2422	4.8*
<i>var</i>	230	72	63	21	386	0.0
<i>wv</i>	283	202	77	39	601	2.2
<i>yg-8</i>	312	96	100	36	544	0.3
<i>yv</i>	241	109	66	27	443	0.1

The contingency Chi-squares indicated good homogeneity among the several families of each cross. The transmission of singed was quite variable; most families showed no significant variation from the expected 25% while a few had as low as 18-19% singed plants. Classification in all cases was excellent. Three-point tests with *wv-2* and *lut* are in progress.

PART II

STOCK LIST

STOCKS AVAILABLE

Source C. M. Rick

Name and Description

New accessions of tomato species. From our 1974 collections of *L. pimpinellifolium* from coastal Peru, we have increased seed stocks of 29 accessions, which are available to interested investigators. The most interesting of these are the ones from the north coast region, particularly Depts. La Libertad and Lambayeque, where the species is remarkably variable. The populations sampled are polymorphic at most isozyme loci tested and register up to 20% heterozygosity. Outcrossing in the wild grades up to a maximum 40%; in fact, they are so highly cross-pollinated at Davis that we cannot increase them safely in the field without spatial isolation. We have therefore resorted to hand selfing in large population samples grown in the greenhouse. Tests for resistance or other characters should therefore be made on a fair number of individuals.

We also have increased seed stocks of certain *L. cheesmanii*, *chmielewskii*, *hirsutum*, *peruvianum*, and *parviflorum* collected by Dr. Miguel Holle and us in 1970-71 and more recently.

**New combinations:**

L1663 *Ln-Wo<sup>m</sup>* see Research Note

L1664 *hp-Ip* see Research Note

PART III

ADDITIONS AND CORRECTIONS TO THE LIST OF MEMBERS

(Last complete Directory in TGC #24) (Supplement in TGC #25)

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PART IV

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PART V

FINANCIAL STATEMENT

Jan. 1, 1975 - Dec. 31, 1975

	<u>Total</u>
<u>Balance from 1974</u>	\$964.99
 <u>Receipts</u>	
Assessments	\$513.75
Sale of back issues	249.50
Air mail postage	35.50
	<u>798.75</u>
	\$1763.74
 <u>Expenditures</u>	
Printing Report #25	\$338.78
Postage	146.76
Envelopes, invoices, rubber stamp	8.49
Library search service	15.00
Cheque return charge	.50
Xeroxing back issues	112.40
Xeroxing bibliography	2.75
	<u>624.68</u>
 <u>Balance</u>	 \$1139.06

MEMBERSHIP STATUS

(to Dec. 31, 1975)

Assessments paid for	1975	122
	1976	130
	1977	47
	1978	7
	1979	8
	1980	1
	1982	1
	1985	1
	1988	<u>1</u>
Total		318

APPENDIX

Interim Report of the Committee on Varietal Pedigrees 1975

Listings of previous report: TGC 9:1959 - an attached supplement between pages 36 and 37. TGC 11: 36-51, 1961. TGC 16: 53-67, 1966. TGC 18: 64-71, 1968. TGC 19: 39-45, 1969. TGC 20: 79-86, 1970. TGC 21: 61-64, 1971. TGC 22: 47-52, 1972. TGC 23: 49-56, 1973. TGC 24: 46-52, 1974. TGC 25:36-41, 1975.

COMMITTEE ON VARIETAL PEDIGREES

Alexander, L. T.	Groszmann, H. (Australia)
Andrasfalvy, Andras (Hungary)	Hernandez, T. P.
Angell, F. F.	Honma, Shigemi
Baldy, B. (Hungary)	John, C. A.
Cirulli, M. (Italy)	Kooistra, E. (Holland)
Crill, T. P.	Lambeth, V. N. (Chairman)
Darby, L. A. (England)	Leeper, Paul
Daskaloff, C. (Bulgaria)	Odland, M. L.
Frankel, Rafael (Israel)	Pecaut, M. (France)
Frazier, W. A.	Robinson, R. W.
Gabelman, W. H.	Sumeghy, T. B. (Australia)
Gilbert, J. C.	Tomes, M. L.
Graham, T. O .	

Tomato Pedigrees, Characteristics and Reference Publications.

Harris, R. E. 1975. Sub-Arctic Cherry: A subarctic-type tomato. Can. J. Plant Sci. 55:855.

SUB-ARCTIC CHERRY (Plant Gene Resource of Canada No. CH00000678) (NRG 7249).

Pedigree:

Selected from backcross (Mini Rose x Early Sub-Arctic x Early Sub-Arctic)

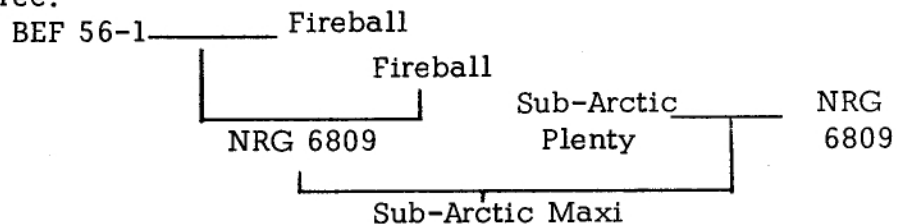
Characteristics:

*sp, u*, red fruit 2-3.5 cm. diameter; ripens 50-55 days after flowering; cold setting ability, strong branching from the axils of the cotyledons, flowers produced below the sixth leaf, large trusses of 20 or more fruits. Cherry-size tomato for sub-arctic areas.

Harris, R. E. 1975. Sub-Arctic Maxi: A large-fruited Sub-arctic type tomato. Can. J. Plant Sci. 55:853.

SUB-ARCTIC MAXI (Plant Gene Resource of Canada No. CH 00000679). (NRG 7262)

Pedigree:



Characteristics:

*sp, u*, red fruit 4-8 cm. x 3-7 cm., ripens 55-65 days after flowering; cold setting ability; rapid branching from the axils of the cotyledons; flowers below the sixth leaf; large fruit trusses; good crack resistance.

Early tomato for regions with low summer temperatures.

Lambeth, V. N. 1975. Mo. AES. Res. Bul. 1010.

LINE 31-St-6

Pedigree

F<sub>6</sub> sel. of Mammoth Wonder (Burgess Seed Co.) x Tomboy  
Tomboy pedigree included P.I. 79532 (Mo. Acc. 160),  
Earliana, Break-O-Day, Bison, Early Stone, Marglobe, Bonny  
Best and Winsall.

Characteristics:

*sp*<sup>+</sup>, *y*, *I*, large fruit (180 g.) , 70 days, tolerant to  
radial and harvest cracking (burst). Released as breeding  
line.

PINK DELIGHT

Pedigree

F<sub>1</sub> 31-St-6 (Mo.) x Traveler (Ark.)

Characteristics:

*sp*<sup>+</sup>, *y*, *I*, large fruit (185 g .), 70 days, tolerant to  
radial and harvest cracking (burst). Possesses attractive  
red overtone, firmness, and slicing qualities of Traveler.  
For fresh market and shipping.

Lapushner, Dvora and Frankel, R. 1973. Correspondence from  
Agricultural Research Organization, Volcani Center, Bet Dagan,  
Israel, dated Dec. 16, 1975.

NAAMA (hybrid 1684). released 1973.

Pedigree

F<sub>1</sub> between an extremely firm breeding line from  
Israel (1630) and a concentrated yielding line from  
California.

Characteristics

*sp*, *I*, *Ve*, *u*<sup>+</sup>, good cover, mid-season concentrated  
yield. Flattened globe, firm, large fruited (150 g.).  
Adapted to fruit set with hormones, tolerant to  
saline water irrigation. Extensively grown in Israel  
in open field for fresh market in winter, spring and  
fall.

CENTENNIAL

Pedigree:

Glamour x Longred



F<sub>2</sub> x KC 146



F<sub>2</sub> x Bounty



F<sub>2</sub> x SD218-1



F<sub>6</sub> (SD 61-233)

Sioux x Webb's Special



F<sub>2</sub> x Fireball VR



F<sub>2</sub> x Gem VR



F<sub>3</sub> x Fireball VR



F<sub>7</sub> (SD 64-270-1)

SD 61-233 x SD 64-270-1



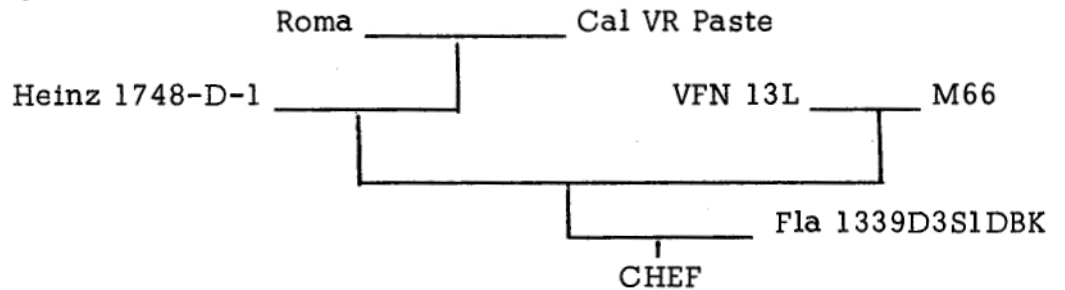
Centennial Hybrid

Characteristics

*sp, u, I, ve*, early (Fireball class), good foliage cover, sets in cool weather, for home gardens and early fresh market in Northern states.

**CHEF (70B131, 71B196, 72B25)**

**Pedigree:**

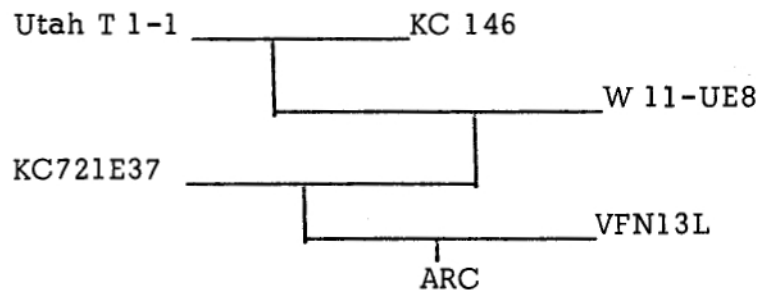


**Characteristics:**

*sp, j*, globe-shaped, 80-100 g. , *I, Ve, Sm*.  
late (95 days, transplanted; 125 days, direct  
seeded), satisfactory vine storage, concentrated  
setting ability, firm fruits. Mechanical harvest-  
processing type for Eastern U.S.

**ARC. (70B850, 71B13, 72B23)**

**Pedigree:**



**Characteristics**

*sp, I, Ve, Sm*, tolerant to *Alternaria*, 70-90g. globe-  
shaped, late (115-120 days transplanted; 145 days  
direct seeded); concentrated setting ability, firm  
fruits. Mechanical harvest-processing type for Mid-  
Atlantic states.

Baldy, B. and Parkas, J. Vegetable Crops Institute, Kecskemet, Hungary.  
Correspondence dated 10 December, 1975.

K 131

Pedigree: Selection of 1053-SI-DI-DBK/J. W. Strobel/  
x KDSM 2 BC<sub>P2</sub>

Characteristics: *sp, u, o, jz*, good foliage cover, late,  
for machine harvest.

K 673

Pedigree: F<sub>7</sub> of KDSM x 1053-SI-DI-DBK/J. W. Strobel

Characteristics: *sp, u, o, j*, midseason, for machine harvest.

K 886

Pedigree: F<sub>6</sub> of K 600 x 407-D3-DZ-RJ-DBC/J. W. Strobel.

Characteristics: *sp, u, jz*, globe, midseason, for machine harvest.

# REPORT

of the

# TOMATO GENETICS COOPERATIVE



NUMBER 26

FEBRUARY 1976

DEPARTMENT OF VEGETABLE CROPS  
UNIVERSITY OF CALIFORNIA  
DAVIS, CALIFORNIA

This report is a medium of exchange among members of information and stock relating to tomato genetics. None of the information herein may be used in publications without consent of the respective authors.

REPORT

of the

TOMATO GENETICS COOPERATIVE  
Number 26 February, 1976

Department of Vegetable Crops  
University of California  
Davis, California 95616

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Cover design from  
mature leaf of torosa (to)  
ca. 1/2 nat. size