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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, 1979, TGC membership stood at 341 (159 U.S. and 182 from other countries), and the financial balance was $1,391.08, constituting an increase over 1978 in both categories.

This issue includes the usual sections except for the Interim Report of the Committee on Varietal Pedigrees. Vic Lambeth indicates that too few new items were received to justify a report this year. Additional features comprise an updated list of tomato species accessions maintained by the Tomato Genetics Stock Center, a linkage summary with key references, and a 10-year index, for which we are indebted to Dora Hunt.

The 1979 annual meeting was held at the national sessions of the American Society for Horticultural Science at Columbus, Ohio on August 1. Minutes appear below. The 1980 meeting is scheduled with the Tomato Breeders Round Table.

It is with great regret that we report the resignation of L. Butler and G. B. Reynard from the Coordinating Committee. Len served since 1953 and George since 1956 (my, how time flies!). Their impact on the shaping of the TGC will have lasting effect, and their retirement from the scene will be felt widely. On consultation with the membership, the CC has replaced Len with Ernie Kerr, thus maintaining one member outside the U.S., and George has been replaced by Al Stevens, who will serve as our industry representative.

Issuing the TGC Reports would not be possible without the willing and talented help of many friends. Dora Hunt again assumed full responsibility for memberships, financial accounts, and the managing and editing of this Report. Betty Perry typed the master copies, and Maureen Farrell aided in proof reading. To them and many other dedicated assistants who helped with TGC 30 we express our deep appreciation.

Coordinating Committee

S. Honma — C. M. Rick, Chairman
E. A. Kerr — Department of Vegetable Crops
R. W. Robinson — University of California
M. A. Stevens — Davis, California 95616

ANNUAL MEETING

The 1979 annual meeting of the Tomato Genetics Cooperative was held at the national sessions of the American Society for Horticultural Science in Columbus, Ohio. The meeting was chaired by Stan Berry, who called it to order at 6:15 p.m. August 1, with a total of 17 people present.

Current membership is 335, with 158 U.S. members and 177 foreign members. The financial balance at the time of the meeting was $1212. It was reported that Len Butler had retired and that Ernie Kerr has been appointed to replace him on the Coordinating Committee.

The reproduction of TGC Reports 1 through 13 was discussed. It was suggested that Nos. 1 through 10 be reproduced and bound in a single volume, while Nos. 11, 12, and 13 be reproduced singly. It was recommended that Nos. 11 through 20 be reproduced and bound into a second volume at a later date when the supply of these issues has been exhausted.

Glen Ruttencutter
Secretary *pro tem.*

LINKAGE REPORT

Tomato Linkage Survey

Charles M. Rick

Dr. Stephen J. O'Brien of the National Cancer Institute asked me to prepare a linkage summary of the tomato for a newsletter on Genetic Maps that he has organized. The following summary represents the one submitted to him, but amended with new information presented in TGC 30. I am most grateful to the many TGC members who gave permission to cite their Research notes which provided critical linkage information.

Since the last summarization in TGC 27, the maps have experienced considerable expansion. The addition of a large number of Cf genes and approximations of most of their loci by Kanwar and colleagues constitute the most notable changes for this period. We are also grateful to Tanksley for his successful efforts to place additional isozymic markers. The total number of genes thus far mapped is 328, of which the locus sites are approximated for 242.

This report consists of three parts. 1) The map has been amended in the usual fashion. 2) In Table 1 I have attempted to assemble key information for all mapped genes. The references do not include all reports on the use of the respective markers; rather, the purpose is to list in chronological order the first report of linkage and other key developments in the placement of the loci. 3) Table 2 consists of a list of all known linkage summaries, providing information of historical interest. The references are listed in chronological order, starting with the first data reported by Hedrick and Booth (1907), which were interpreted as the consequence of genetic linkage by Jones in 1917.

TABLE 1. MAPPED GENETIC LOCI OF THE TOMATO

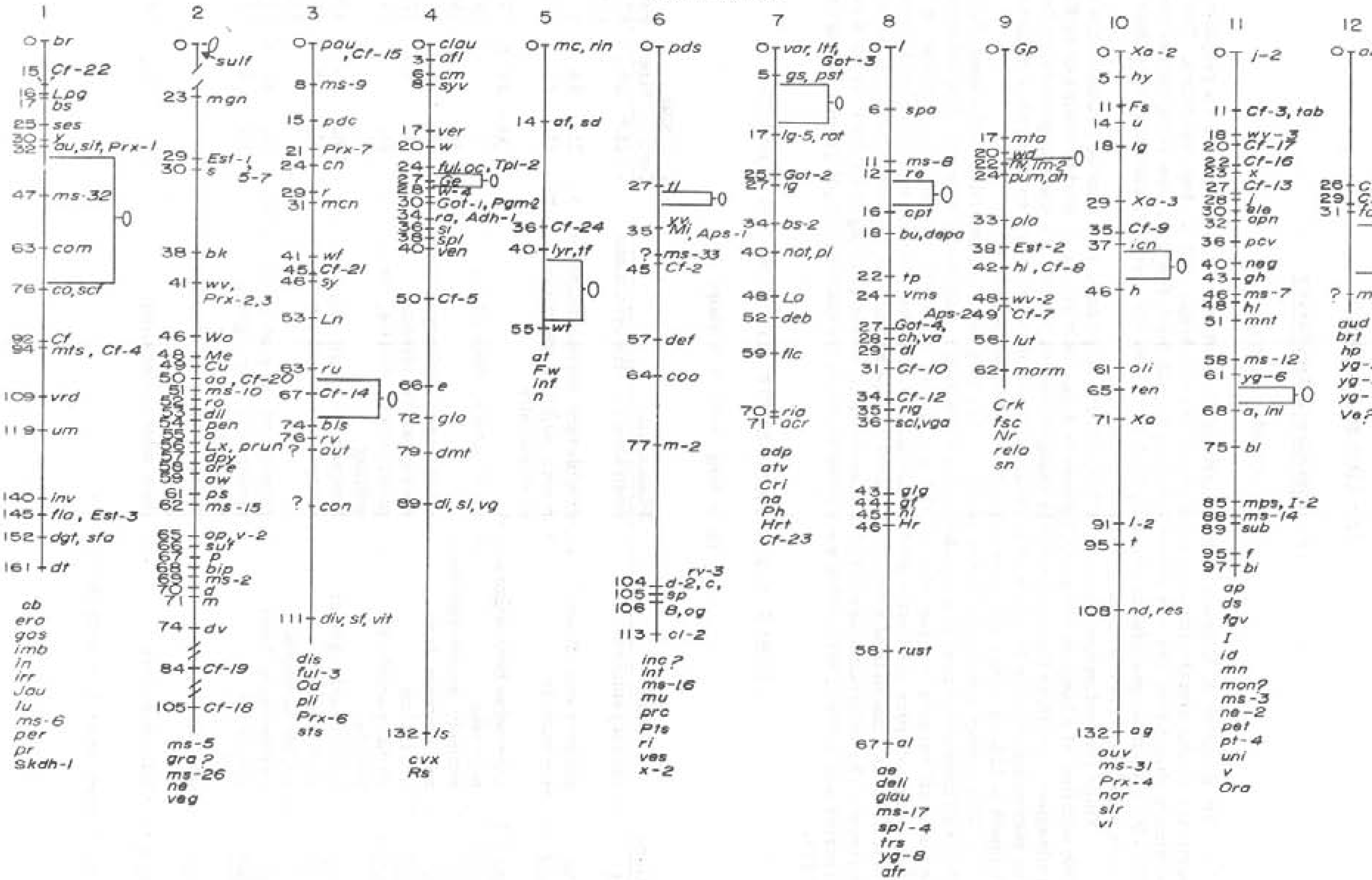
(L = long arm; S = short arm)

Gene	Name	Phenotype	Locus Chrom.	Locus Site	Reference
a	anthocyaninless	completely anthocyaninless	11L*	68	83,85,146, 153,147
aa	anthocyanin absent	completely anthocyaninless	2L	50	5
acr	acroxantha	leaves rugose, yellowing centripetally	7L	71	101
Adh 1	Adenosine dehydrogenase-1		4L	34	179
adp	adpressa	plant small, decumbent	7L		141,26
ae	entirely anthocyaninless		8L		166
af	anthocyanin free	completely anthocyaninless	5S	14	165,104
afl	albifolium	strong white virescent	4S	3	123
afr	anthocyaninless fragile	plant small, brittle, over-wilting	8L		54
ag	anthocyanin gainer	laminae abaxially pigmented	10L	132	110,111,65
ah	Hoffman's anthocyaninless	completely anthocyaninless	9L	24	117,118,169, 152,71,65
al	anthocyanin loser	pigmented only at nodes later	8L	67	137,15,69
alb	albescent	strong white/lt. green variegation	12S	0	62,69,70
ap	apetalous	most or part of corolla lacking	11		144
apn	albo-punctata	fine white speckling	11S	32	88

*S = short arm; L = long arm.

LINKAGE MAP

Chromosomes



Aps-1	Acid phosphatase-1		6L	35	148,86A
Aps-2	Acid phosphatase-2		8L	27	181
are	anthocyanin reduced	younger leaves of older plants pigmented	2L	58	5
at	apricot	fruit flesh color	5		55
atv	atroviolacea	intense anthocyanin pigmentation	7L		161,26
au	aurea	bright yellow foliage	1S	32	84,16,176,69
aud	auroid	uniform yellow foliage	12S		161,57
aut	aureata	virescent brilliant yellow	3L		165
auv	aureate virescent	virescent speckled yellow	10		139
aw	without anthocyanin	complétely anthocyaninless	2L	59	27,24,69
B	Beta-carotene	= the major fruit pigment	6L	106	85,36
bi	bifurcate	extreme stem fasciation (with j)	11L	97	87
bip	bipinnata	highly divided leaves	2L	68	34
bk	beaked	fruit stylar end pointed	2L	38	188
bl	blind	stems terminate in first inflorescence	11L	75	129
bls	baby-lea syndrome	lacks anthocyanin, habit compact	3L	74	184,69
br	brachytic	internodes shortened	1S	0	84,14,65
brt	bushy root	dense mass of short roots	12		191
bs	brown seeds	endosperm brown	1S	17	99,97
bs-2	brown seed-2	endosperm brown	7L	34	97
bu	bushy	internodes and inflorescences foreshortened	8L	18	188,15,156
c	potato leaf	fewer leaf segments	6L	104	84,85,116,36, 63,69,170
cb	cabbage	leaves large, dark green	1		76,77
Cf	Cladosporium fulvum	resistance	1L	92	73
Cf-2	Cladosporium fulvum-2	resistance	6L	45	73,59,39,38
Cf-3	Cladosporium fulvum-3	resistance	11S	11	73,38
Cf-4	Cladosporium fulvum-4	resistance	1L	94	38
Cf-5	Cladosporium fulvum-5	resistance	4L	50	38
Cf-6	Cladosporium fulvum-6	resistance	12S	26	38
Cf-7	Cladosporium fulvum-7	resistance	9L	49	38
Cf-8	Cladosporium fulvum-8	resistance	9L	42	38
Cf-9	Cladosporium fulvum-9	resistance	10S	35	38
Cf-10	Cladosporium fulvum-10	resistance	8L	34	38
Cf-11	Cladosporium fulvum-11	resistance	12S	29	38
Cf-12	Cladosporium fulvum-12	resistance	8L	31	38A
Cf-13	Cladosporium fulvum-13	resistance	11S	27	38A
Cf-14	Cladosporium fulvum-14	resistance	3	67	38A
Cf-15	Cladosporium fulvum-15	resistance	3S	0	38A
Cf-16	Cladosporium fulvum-16	resistance	11S	22	38A
Cf-17	Cladosporium fulvum-17	resistance	11S	20	38A
Cf-18	Cladosporium fulvum-18	resistance	2L	105	38A
Cf-19	Cladosporium fulvum-19	resistance	2L	84	38A
Cf-20	Cladosporium fulvum-20	resistance	2L	50	38A
Cf-21	Cladosporium fulvum-21	resistance	4L	45	38A
Cf-22	Cladosporium fulvum-22	resistance	1S	15	38A
Cf-23	Cladosporium fulvum-23	resistance	7		38A
Cf-24	Cladosporium fulvum-24	resistance	5S	36	38A

ch	chartreuse	corolla greenish yellow	8L	28	119,145,154
cl-2	cleistogamous-2	flowers open only slightly	6L	113	129,146
clau	clausa	leaves subdivided, segment tips acute	4S	0	122,61,65, 69
cm	curly mottled	leaves mottled, distorted	4S	6	60,66
cn	cana	leaves gray-green	3S	24	192
co	cochlearis	leaves reduced, pinnae concave	1L	76	108
coa	corrotundata	pinnae, flower parts short, broad	6L	64	192
com	complicata	leaves exceedingly subdivided	1		63,150
con	convalescens	foliage yellow-green, paler at growing point	3L		6
cpt	compact	habit compact, exceedingly branched	8L	16	126,154,68
Cri	Crispa	all parts small; leaves necrotic	7		107
Crk	Crinkled	leaves condensed, segments dentate	9		78,79
Cu	Curl	petiole and leaf veins foreshortened	2L	49	152
cvx	convexa	leaf segments narrow, margins reflexed	4		4
d	dwarf	all parts foreshortened; leaves dark, rugose	2L	70	37,80,82, 137,69
d-2	dwarf-2	retarded growth	6L	104	138
def	deformis	flowers deformed	6L	57	160,30
deli	deliquescens	habit changing from dense to loose	8		R.W. Robinson (oral com.)
depa	depauperata	plants very small; leaves variably yellowish	8L	18	155
det	detrimentosa	growth slow; foliage virescent	7L	52	159,69
dgt	diageotropica	stems and roots diageotropic; roots unbranched	1L	152	189,190
di	divergens	stems slender, streaked whitish	4L	89	17,18,65
dil	diluta	leaves small, dull light green	2L	53	158
dis	discolor	leaves lt. green, darker veins	3		150
div	divaricata	plant small, compact	3L		111,141
dl	dialytic	stamens free	8L	29	167,137,156
dmt	diminutiva	internodes Δ leaves foreshortened	4L	79	88
dpy	dumpy	leaves condensed, rugose, dk green	2L	57	35
ds	dwarf sterile	plant retarded, highly sterile	11		113
dt	dilatata	leaves yellowish, veins darker	1L	161	150
dv	dwarf virescent	plant stunted, pale green virescent	2L	74	168
e	entire	leaf segments few; midvein distorted	4L	66	118,18,69, 135
ele	elegans	plant tiny; leaves reduced, yellow-green	11S	30	105
era	eramosa	plant reduced; pinnae irregular	1		193

Est-1	Esterase-1		2L	29	149
Est-2	Esterase-2		9L	38	180
Est-3	Esterase-3		1L	145	181
Est-5, 6,7	Esterase-5,6,7		2L	29	149,180
f	fasciated	fruits many loculed	11L	95	83,85
fd	flecked dwarf	plants retarded; leaves flecked lt. green	12S	31	157,69,70
fgv	fimbriate gold virescent		11		4
fla	flavescens	leaves lt. green, few segments	1L	145	159,160
flc	flacca	leaves small, tending to overwflt	7L	59	105
Fs	Fruit stripe	broad distal stripe (ex. L. hirsutum)	10S	11	23
fsc	fuscatinervis	pinnae yel-green, veins dk. green	9		161
ful	fulgens	leaves bright yellow, turning green	4S	24	159,65,69, 135
ful-3	fulgens-3	same as ful	3		4
Fw	Furrowed	plant stunted, cotyledons deeply furrowed	5		110
gas	gamosepalous	sepals partly connate; plants and leaves highly modified	1		193
Ge	Gamete eliminator	pollen tends to abort	4	27	134,135
gf	green fruit	chlorophyll persists in fruit locules	8L	44	40,17
gh	ghost	cots. green; true leaves albino	11S	43	7,163,69
glau	glaucescens	leaves short, chlorotic	8		101
glg	galapagos light green	leave lt. gray-green, darker veins	8L	43	151
glo	globosa	internodes & leaves short	4L	72	60
Got-1	Glutamate oxaloacetate transaminase-1		4L	30	149
Got-2	Glutamate oxaloacetate transaminase-2		7L	25	149,181
Got-3	Glutamate oxaloacetate transaminase-3		7S	0	149,181
Got-4	Glutamate oxaloacetate transaminase-4		8L	27	181
Gp	Gamete promoter	promotes gamete competition	9S	0	91,92
gra	gracilis	plants tiny, delicate, unbranched	2L?		57
gs	green stripe	unripe fruit with radial green stripes	7S	5	145,44,65
h	hairs absent	large trichomes lacking	10L	46	85,137,70
hi	hilara	pinnae lt. green, rugose, crenate	9L	42	106
hl	hairless	large trichome shafts lacking	11S	48	10,153
hp	high pigment	fruit pigments intensified	12S		56
Hr	Hirsute	long hairs on adaxial leaf surface	8L	46	155
Hrt	Hirtum	increased density of large trichomes	7L?		127
hy	homogeneous yellow	all vegetative parts yellow	10S	5	165
I	Immunity to Fusarium race 1		11		89
I-2 race 2	Immunity to Fusarium race 2		11L	74	75
icn	incana	leaves emerge with whitish margins	10	nr.37	161
id	indehiscens	sepals connate; pinnae broad	11		34

ig	ignava	habit erect, little branched; leaves large, lt. green	7L	27	6
imb	imbecilla	plant weak, few branches; leaves yellowish	1		140
in	indiga	plant small, dainty; leaves gray-green	1		42
inc	incurva	pinnae curled, margins undulate	6?		45
inf	infirma	plant tiny; leaves plicate, reflexed	5S		140,103
ini	inquieta	leaves lt. green; large trichome shafts lacking	11L	68	193
int	integerrima	leaf margins almost entire	6		45
inv	invalida	leaves with fine yellowish flecks	1L	140	159,149,65
irr	irregularis	leaves shortened, irregularly veined	1		45
j	jointless	pedicel jointless; inflorescence leafy	11S	28	9
j 2	jointless-2	pedicel jointless; inflorescence leafy	11S	0	122,38
Jau	Jaundiced	foliage dull yellow green; growth retarded	1		128
l	lutescent	leaves prematurely yellowing	8S	0	188,137, 156,67
l-2	lutescent-2	leaves prematurely yellowing	10L	91	40
La	Lanceolate	leaves small, simple, entire	7L	48	6,68
lg	light green	light green foliage color	10S	18	12,102
lg-5	light green-5	light green foliage color	7L	17	44
Ln	Lanata	herbage excessively hairy	3S	53	88
Lpg	Lapageria	flowers campanulate; leaves dk. green	1S	16	130,142
ls	lateral suppressor	few or no branches; corolla reduced	4L	132	146,147
ltf	latifolia	cots and pinnae very broad	7S	0	88
lu	luteola	corolla light yellow	1		108
lut	lutea	leaves yel. green, veins darker	9L	56	69
Lx	Laxa	leaves pendant, elongate, acute seg. tips	2L	56	147
lyr	lyrata	leaves entire, fan shaped	5S	40	131
m	mottled	leaves with fine pale green flecks, distorted	2L	71	188
m-2	mottled-2	leaves finely speckled yellow	6L	77	8,178
marm	marmorata	leaves marbled white-lt. green	9L	62	6,65
mc	macrocalyx	sepals and inflorescence leafy	5S	0	109,137,65
mcn	maculonecrotic	leaves with yellow spots becoming necrotic	3S	31	139
Me	Mouse ears	leaves 3-4-pinnately compound, pinnae clarate	2L	48	114,152
mgn	marginal necrotic	leaf margins yellow, becoming necrotic	2L	23	139
Mi	Meloidogyne incognita	resistance to root knot nematode	6L	35	28,29,148 86A

mn	minuta	plants small, erect, nearly unbranched	11		42
mnt	miniature	plants small; reduced branching	11S	51	133
mon	monstrosa	plants tiny, unbranched;	11L		53
mps	miniature phosphorus syndrome	tiny compact plants; foliage yellowish, blotched purple	11L	85	165
ms-2	male-sterile-2		2L	69	2
ms-3	male-sterile-3		11		100
ms-5	male-sterile-5		2L		100
ms-6	male-sterile-6		1		100
ms-7	male-sterile-7		11S	46	100,25
ms-8	male-sterile-8		8S	11	100
ms-9	male-sterile-9		3S	8	100,60
ms 10	male-sterile-10		2L	51	19,121,93, 94,95,98
ms-12	male-sterile-12		11S	58	100,25
ms-14	male-sterile-14		11L	88	2,25
ms-15	male-sterile-15		2L	62	100,24
ms-16	male-sterile-16		6		2
ms-17	male-sterile-17		8		3
ms-26	male-sterile-26		2L		3
ms-31	male-sterile-31		10		2
ms-32	male-sterile-32		1	47	95,96,97,98
ms-33	male-sterile-33		6		2,3
ms-42	male-sterile-42		11		2
mta	mutata	habit small, broad bush; yel-green virescent	9S	17	192
mts	mortalis	small bush habit; no inflorescences	1L	94	194
mu	multinervis	leaves dainty, lt. green intercostally	6		34
mua	multifurcata	1st inflor. multibranched; dull green interveinal chlorosis	12L		192
n	nipple tip	(at stylar end of fruit)	5		85
na	nana	tinyplant; internodes and leaves very short	7		158,26
nd	netted	leaves interveinally chlorotic	10L	108	20
ne	necrosis	leaves progressively necrotic (with Cf-2)	2L		73
ne-2	necrosis-2	similar to ne	11		48
neg	neglecta	plant small; leaves recurved, becoming necrotic	11S	40	158,173
ni	nitida	leaves long-petioled, pinnae deeply cut	8L	45	150
nor	non-ripening	fruit ripening greatly retarded	10S		182
not	notabilis	leaves tiny, tending to overwilt	7L	40	6,69
Nr	Never ripe	fruits ripen slowly to dull orange	9		50
nv	netted virescent	leaves fimbriate margined, pale interveinal chlorosis	9L	22	175,21,22, 129,71,169
o	ovate	fruit elongate	2L	55	37,82
oc	ochroleuca	leaves attenuate, chlorotic, becoming white variegated	4S	24	105

Od	Odorless	herbage with little or no volatiles	3		145,147
og	old gold	corolla tawny orange	6L	106	125,147,170
oli	olivacea	leaves blotched pale olive green	10L	61	34,49
op	opaca	leaf lt. green, yellow virescent	2L	65	41,42
Ora	Orobanche aegyptiaca	resistance	11S		3A
p	peach	fruit surface dull, more hairy	2L	67	80,82
pau	pauper	plants tiny, weak, unbranched	3S	0	42
pca	proclinata	plant small, lax, spreading; leaves chlorotic	8L	29	105
pcv	polychrome variegated	leaves distorted, fine striated white-lt. green	11S	36	138
pdc	pudica	plant retarded, dark pigmented	3S	15	139
pds	phosphorus deficiency syndrome	retarded growth; leaves blotched yellow, purple	6S	0	165
pen	pendens	leaves broad, convex, pendent, glossy	2L	54	141
per	perveridis	retarded; leaves dark green, falling early	1		140
plt	penetrabile	plant small, stocky; leaves short, rugose	11		101
Pgm 2	Phosphoglucomutase-2		4L	30	179
Ph	Phytophthora infestans	resistance to race To	7		90
pl	perlucida	pinnae narrow, lt. green, yellowing early	7L	40	150
pla	plana	plant small, rigid; leaves chlorotic	9L	33	108
pli	plicata	all parts small; leaves dk. yellowish, folded	3		105
pr	propellor	cots large, like propellor blades	1		160
prc	procumbens	internodes short; leaves short, rugose	6		141
prun	prunoidea	all parts, partic. fruit, elongate	2L	56	140
Prx-1	Peroxidase-1		1S	32	181
Prx 2,3	Peroxidase-2,3		2L	41	162
Prx-4	Peroxidase-4		10S	37	149
Prx-6	Peroxidase-6		3		149
Prx-7	Peroxidase-7		3S	21	149,181
ps	positional sterile	corolla not unfurled; indehiscent anthers	2L	61	11,74
pst	persistent style	developing into beak	7S	5	47,133
pt4	pseudo triplo-4	leaf, flower parts elongate	11		151
Pts	Petroselinum	leaves tripinnately segmented	6L		136A
pum	pumila	plant tiny, dainty, few branches	9L	24	6,70
r	fruit flesh yellow		3S	29	188,68
ra	rava	leaves reflexed, dull gray-green; stems excessively hairy	4L	34	158,34,65, 69,135

re	reptans	plant elongate, less branched, inclined, becoming prostrate	8S	12	105,70
rela	relaxata	habit open, lax; leaves chlorotic	9		6
res	restricta	plant small, compact; leaves chlorotic	10L	108	106
ri	ridged	ridged or rough leaves	6L		81,30
ria	rigidula	plant small; leaves stiff, chlorotic	7L	70	193
rig	rigida	plant small, rigidly erect; leaves chlorotic	8L	35	105
rin	ripening inhibitor	fruits ripen very slowly to yellow	5S	0	171
ro	rosette	internodes very short; no flowers	2L	52	13
rot	rotundifolia	leaves short, broad, blistered	7L	17	105
Rs	Roots suppressed	survives only if grafted	4		51
ru	ruptilis	pinnae narrow, keeled, dull lt. green	3S	63	6,64,69
rust	rustica	plants dwarf; leaves broad, blunt, fewer segments	8L	58	159
rv	reticulate virescent	new leaves pale green, darker veined, turning green	3S	76	152,124,68
rv-3	reticulate virescent-3	same as rv	6L	104	147
s	compound cluster	inflorescenses strongly proliferated	2L	30	82,174
scf	scurfy	cotyledons scurfy, striated	1L	76	132,65,190
scl	seasonal chlorotic lethal	cots. pale yellow; dies at lower light intensities	8L	36	165
sd	sun dwarf	internodes scarred, very short at high light intensities	5S	14	124,104
ses	semisterilis	plant small, erect, unbranched, fertility reduced	1S	25	108
sf	solanifolia	pinnae entire, apiculate, concave	3L	111	152,104,69, 68
sfa	sufflaminata	plant smaller, pinnae concave, chlorotic	1L	152	194
sh	sherry	fruit flesh yellow, reddish tinged	10		77A
si	sinuata	reduced growth; leaves undulate margined, yellow-green	4L	36	140
sit	sitiens	plant small, weak; leaves overwilting	1S	32	159
Skdh-1	Shikemic acid dehydrogenase-1		1		181
sl	stamenless	stamens usually lacking	4L	89	18
sn	singed	patent hairs smaller, trichomes distorted	9		187
sp	self-pruning	habit determinate	6L	105	84,85,14, 36,147,170
spa	sparsa	reduced growth; leaves yellow-green, becoming whitish blotched	8S	6	34,154
spl	splendens	leaves shiny, yel.-green, dk. veined	4L	38	106

spl-4	splemdens-4	as in spl	8		4
sts	stamen suppressor		3		2,3
sub	subtilis	plant tiny, internodes short; fastigiate	11L	89	158,159,140
suf	sufflava	foliage uniformly light green	2L	66	158
sulf	sulfurea	leaves yellow; viable only if grafted	2L		31,32,33
sy	sunny	cots. whitish; true leaves yellow virescent	3S	46	8,64,69
syv	spotted yellow virescent	growing point bright yellow, white speckled laminae	4S	8	151
t	tangerine	fruit flesh and stamens orange	10L	95	85,147,65, 69
tab	tabescens	plant stunted; leaves yellow-green, violet-veined, necrotic speckling	11S	11	108,72
ten	tenuis	plant v. retarded; leaves lt. green	10L	65	105
tf	trifoliate	leaves 3-segmented; petiole elongate	5S	40	115,147,65, 69
tl	thiaminless	leaves blotched yellow; req. thiamine	6S	27	142,69
Tm-2	Tobacco mosaic-2	resistant to many strains of TMV	9L	22	175,21,22, 169
tp	tripinnate	plant retarded; leaves tripinnately compound	8L	22	45
Tpi-2	Triose phosphate isomerase-2		4S	24	181
trs	tristis	plants v. small; leaves narrow, plicate, strongly pendant	8		139
u	uniform ripening	unripe fruits lack bicolor pigmentation	10S	14	85,147,70
um	umbrosa	foliage darker green, wilted appearance	1L	119	194
uni	unicaulis	habit weak, upright, nearly branchless	11		106
v	virescent	white seedlings, turning to green	11		185
v-2	virescent-2	emerging leaves pale (in greenhouse)	2L	65	43,45
va	varia	leaves emerge yellow-green, turning normal	18L	28	158
var	variabilis	leaves emerge yellow-green, turning normal	7S	0	108,67,68, 69
Ve	Verticillium wilt	resistance to strain 1	12?		58
ven	venosa	weak growth; leaves small, whitish-yellow, green-veined	4L	40	159
ver	versicolor	immature leaves finely mottled yellow, green-veined	4S	17	105
ves	versiformis	pinnae pointed, keeled, bright green	6	54?	6
vg	vegetative	flowers highly deformed, usually functionless	4L	89	145,124

vga	virgulta	plant small; leaves emerger lt. yellow-green turning dull green	8L	36	193
vi	villous	stem very hairy	10		53
vit	vitiosa	later leaves with twisted filiform pinnae	3L	111	6
vlg	virescent light green	plant small; leaves lt. green, virescent	2L		139
vms	variable male sterile	anthers abortive at high temp.	8L	24	143
vrd	viroid	leaves very distorted, white-speckled chlorotic	1L	109	164
w	wiry	leaves progressively reduced to midvein filaments	4S	20	18
w-4	wiry-4	as in w except less extreme	4L	28	123,134, 135,65
wd	wilty dwarf	plants stunted; leaves gray-green, droop if drought stressed	9S	20	137,152
wf	white flower	corolla white-buff	3S	41	188,14,147, 68
Wo	Woolly	all parts densely pubescent	2L	46	188,121
wt	wilty	leaf margins curl adaxially	5L	55	85,137,65
wv	white virescent	leaves emerge white, turning green	2L	41	120,124
wv-2	white virescent-2	leaves emerge white, green-veined, turning normal	9L	48	138
wv-3	white virescent-3	leaves emerge white, turning green	11S	18	4
x	gametophytic factor induces microgamete abortion		11S	23	89,1
x-2	gametophytic factor-2	as in x	6		177
Xa	Xanthophyllic	leaves uniformly yellow; homozyg. inviable	10L	71	188
Xa-2	Xanthophyllic-2	as in Xa	10S	0	53
Xa-3	Xanthophyllic-3	as in Xa, but less extreme	10S	29	46
y	colorless fruit epidermis		1S	30	84,137
yg-2	yellow-green-2	foliage uniformly gellow-green	12S		56
yg-3	yellow-green-3	leaves unif. yellow-green, ragged margins	12		20
yg-4	yellow-green-4	leaves unif. yellow-green, margins curled	12		172
yg-6	yellow-green-6	leaves bright yellow, blotched white	11	61	183,173
yg-8	yellow-green-8	leaves bright yellow	8		186
yv	yellow virescent	leaves emerge yellow, turn green	6L	34	118,147, 69,86A

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TABLE 2. LINKAGE SUMMARIES LISTED IN CHRONOLOGICAL ORDER
(TGC = Report of The Tomato Genetics Cooperative)

Year	References	Chromosome
1907	HEDRICK, U. P. and N. O. BOOTH. Proc. Amer. Soc. Hort. Sci. 5:19-24.	2
1917	JONES, D. F. Amer. Nat. 51:608-621.	2
1926	MACARTHUR, J. W. Genetics 11:387-405.	2
1928	MACARTHUR, J. W. Genetics 13:410-420.	2, 8, 11
1931	MACARTHUR, J. W. Trans. Roy. Can. Inst. 18:1-20.	all
1934	MACARTHUR, J. W. J. Genet. 29:123-133.	all
1947	YOUNG, P. A., and J. W. MACARTHUR. Texas Agric. Expt. Sta. Bul. 698:1-61.	all
1952	BUTLER, L. J. Hered. 43:25-35.	all
1955	BUTLER, L. TGC 5:7-14.	1, 3, 6, 10
1956	BUTLER, L. TGC 6:11-12.	8, 10
	RICK, C. M., and L. BUTLER. TGC 6:26-27.	all
	RICK, C. M., and L. BUTLER. Adv. Genetics 8:267-382.	all
1958	LINKAGE COMMITTEE. TGC 8:7-8.	all
1959	BUTLER, L. TGC 9:25-27.	11
1960	BUTLER, L., Can. J. Bot. 38:365-379.	2
	KERR, E. A. TGC 10:20-21.	10
	LINKAGE COMMITTEE. TGC 10:4-5.	all
1962	BUTLER, L. TGC 12:18.	2
	NOTANI, N. K. TGC 12:34-36.	8
	SNOAD, B. TGC 12:44-45.	2
1963	BUTLER, L. TGC 13:9.	2
	LINKAGE COMMITTEE. TGC 13:3-6.	all

	RICK, C. M., and G. S. KHUSH. TGC 13:24-25.	8
1965	KHUSH, G. S. TGC 15:35-37	4
	LINKAGE COMMITTEE. TGC 15:3-6.	all
1966	CLAYBERG, C. D., L. BUTLER, E. A. KERR, C. M. RICK, and R. W. ROBINSON. J. Hered. 57:188-196.	all
1967	KHUSH, G. S., and C. M. RICK. Genetica 38:74-94.	4
1968	KHUSH, G. S., and C. M. RICK. Chromosoma 23:452-484.	all
	LINKAGE COMMITTEE. TGC 18:4-6.	all
1969	BUTLER, L. TGC 19:2.	2
	RICK, C. M., and G. S. KHUSH. Genetics Lectures (Corvallis, Ore.) 1:45-68.	all
1971	LINKAGE COMMITTEE. TGC 21:10-11.	all
	RICK, C. M. Stadler Symp. 2:153-174.	all
1972	BUTLER, L. Can. J. Bot. 50:109-119.	2
	RICK, C. M., R. W. ZOBEL, and L. BUTLER. In: Altman, P. L., and D. S. Ditmer (eds.). Biol. Data Book (2nd ed.) 1:81-84.	all
	ZOBEL, R. W. TGC 22:30-32.	1
1973	KERR, E. A. TGC 23:20-21.	10
	LINKAGE COMMITTEE. TGC 23:9-11.	all
1975	RICK, C. M. In: King, R. C. (ed.). Handbook of Genetics 2:247-280.	all
1977	LINKAGE COMMITTEE. TGC 27:3-5.	all

GENE LIST REVISIONS

(Last revision TGC 29:16-18)

TGC 21:8

delete as indicated tf (~~tri~~,ct)

insert tf^2(tri); (ref. Stubbe, 1963)

change to^2 to $bl^2(to^2)$; (ref. Sciari et al. TGC:30)

TGC 23:6

change py to pyl (Note: Hogenboom did not give a symbol, thus Stubbe's py in TGC 29:13 has priority.)

TGC 29:8

delete as indicated

	I-2	~~Latterot~~ & ~~Kaan~~, ~~TGC 25:12~~	Immunity to Fusarium lycopersici-2. ~~French line~~ GRA66
insert		Cirulli & Alexander, 1966	

TGC 29:13

delete as indicated

	ps-2	~~Philouze~~, ~~TGC 28:13~~	positional sterile-2. Positional sterile flowers; ~~prevents normal opening of corolla. French line.~~
insert		Tronicka, 1966	pollen sacs do not open.

PART I
RESEARCH NOTES

Al-Kummer, M. K., and I. B. Taylor Observations on flowering and vegetative development of *Solanum lycopersicoides.*

In response to the research note in TGC Report 29:29 concerning the problems of inducing flowering in *Solanum lycopersicoides* (Phills and Robinson, 1979), we thought that it might be instructive to relate our experiences with this species. Using both vegetatively propagated material and seedlings of *S. lycopersicoides* (P1365 378), we have not yet failed to induce flowering in a growth chamber set at 18 $\pm$ 1^{o}C, with a short day photoperiod (10 h light/14 h dark) supplied by fluorescent tubes with a light intensity of around 1000 FtC. These conditions approximate the 10-15^{o}C, 1000-1200 FtC regime recommended by Phills and Robinson.

The major difference is that they do not specify a daylength and suggest that photoperiod is relatively unimportant. Although we have not conducted extensive tests into the interaction of the three main variables (temperature, light intensity and photoperiod), we have found that under our standard growing conditions the daylength is critical. Two identical groups of *S. lycopersicoides* have been grown in closely similar growth chambers, both generating 1000 FtC and maintaining a constant 18 $\pm$ 1^{o}C temperature. One group was subjected to a photoperiod of 10 h light/14 h dark, while the other was given 16 h light/8 h dark. The former flowered profusely whereas the latter group remained vegetative. These results are consistent with our observations of glasshouse grown plants in England.

In addition to the flowering problem, we initially encountered some difficulty in maintaining our stock of *S. lycopersicoides.* Propagating by means of cuttings has presented no problem. With some genotypes young shoots have even arisen from the roots of a mature plant, rendering it unnecessary to take cuttings. We are not aware of spontaneous plantlet formation occurring in any other close relative of the tomato and do not rule out the possibility that these propagating 'roots' are in fact subterranean shoots. In raising plants from seed we have encountered germination problems. Initially this was due to harvesting the fruit prematurely. *S. lycopersicoides* fruit takes takes an extremely long time to mature and this is only marked by the fruit becoming a slightly paler green. In practice we now leave the fruit on the plants for approximately four months from pollination. Even after this period the fresh seed usually fails to germinate unless the seed coat is cut to facilitate the emergence of the radicle.

Avdeyev, Y. I., and B. M. Shcherbinin Ora*,* the gene for resistance to *Orobanche aegyptiaca,* may be on chromosome 11.

In TGC 27 we reported a tomato line PZU-11 resistant to broomrape, *Orobanche aegyptiaca.* In the period 1975-1977, PZU-11 and Bush-Line with the *Ora* gene were crossed with other varieties and genetic lines. Results show no evidence of linkage between *Ora* and, *sp, d, u, o, t Tm-2, Tm*, and *O*; that is, broomrape resistance segregates independently of these genes. At that time, we tested 55 F_2 jointless plants from the cross: PZU-11 x Mashinny (*j*). We found only one (1.82%) resistant *j* plant under conditions of severe infection. In 1978 we exposed 256 *j* plants in the F_2 Volganin (*j*) X Bush-Line (*Ora*) to standard-level infection. Only 8 plants (3.12%) were resistant to broomrape - i.e., only 1/24 of the number expected. According to these data, we believe that *Ora* is linked with *j* on chromosome 11.

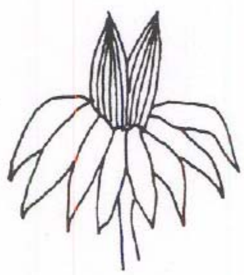
Campion, B., M. Schiavi, and G. P. Soressi Potential of torosa^{2} for tomato breeding.

To radically solve the problem of mechanically harvesting tomatoes in Italy, we need an ideal plant (ideotype) characterized by upright habit, lack of lateral shoots, and bearing 1-3 fruits in the first truss, at which growth stops.

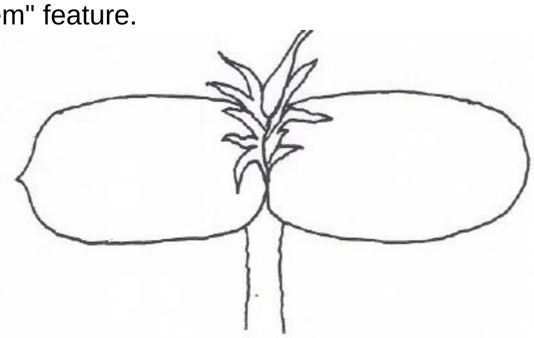
Such a plant possessing a maximum of earliness and fruit ripening concentration should be mechanically harvested by cutting the stems far enough above ground to avoid separation of stones, soil, and green fruits.

Seeking a genetic basis for such a plant, 7 tomato stocks were crossed with the mutants eramosa, minuta, parva, rigida, rigida^2 , torosa, torosa^2, unicaulis (all of the foregoing = Stubbe's mutants), non-branching (Alexander), and lateral suppressor {Darby). The F_2 generations were screened in field plantings. "Monostem" phenotypes, very close to the above-outlined ideotype, were found in the progenies involving torosa as a parent. Some of these monostem plants were crossed with 13 common tomato varieties and the subsequent progenies selected for the traits peculiar to the ideotype.

To check the breeding potential of *to*^{2}, 21 of the monostem lines thus selected (14 S_6, 1 S_5, 1 S_4, 1 S_3, 2 BC_1S_5, 2 BC_1S_3) were compared with the cvs. UC-105 and Chico III. The earliest monostem lines ripen on the average of 20 days before Chico III; a maximum of ripening concentration was shown by the I truss - 1 flower - I fruit phenotypes; the highest yield performance was shown by monostem plants bearing 2-3 trusses with 2-3 fruits each, obviously less concentrated in fruit ripening and not upright. In contrast, the dwarf monostem phenotypes were upright, but their fruits were severely affected by radial cracking. A high frequency of "double flowers" and "double fruits" (see figure) appeared related with the "monostem" feature.



"double flower"



"double fruit"

On the basis of such genetic material we believe it is possible to select "monostem" lines promising for breeding very early tomato varieties endowed with optimum fruit ripening concentration and suitable to high density population for mechanical harvesting also in non-favorable soils and climates.

Farrell, M. and C. M. Rick Recurring mutants at established loci.

In screening progenies of 1782 M_1 plants derived from EMS-treated seeds (cv. VFNT Cherry, synthesized by Dr. Paul Smith at U.C., Davis), we found three mutants which complementation tests have demonstrated to be allelic to *alb, c,* and *d.* Crosses to homozygous standard marker stocks exhibited hairy stems, an incompletely dominant trait conferred by the multiply-marked tester on the maternal hairless cv. VFNT Cherry mutants in all F_1's, which also expressed the mutant phenotypes. The dwarf (*d*) and albescent (*alb*) F_1's were carried through to the F_2 generation which segregated for the other test markers. The dwarf phenotypes in the F 's segregated inter se, with 81 of 274 being of scorable size one month earlier than the remaining 194 --- results not significantly different from a 1:3 ratio ($x^2 = 2.7$). Thus, these two alleles sharing a common locus are of different genetic constitution (mutons of a single recon). The new dwarf mutant, a more extreme phenotype with thicker, more rugose and recurved leaves, shorter internodes and a slower growth rate, is dominant to the original *d* allele, which occurred as a spontaneous mutation.

These mutants have been assigned the accession numbers 3-625 (*alb*), 3-626 (*c*), and 3-623 (*d*), and seeds are available to members on request. Seeds for the isogenic multiply-resistant, early, brachytic, cherry cultivar carrying the normal alleles are likewise available.

Additional information on the M_1 progenitors of these mutants is presented here.

3-625: alb allele (map position 125-0)

ex 78L1101-443 (slow): 50% fruit set, 50% normal plant diameter

Fruit	+	alb	f(alb)	Other mutants: narrow leaf	Other mutants: light green
1	1				
2	13	4	0.20	3	
3	14				3

3-626: c allele (map position 6L-93)

ex 7861101-857 (very slow): 50% fruit set, 65% normal plant diameter

Fruit	+	c	f(c)	Other mutants: yg, stiff recurv.lvs	Other mutants: dwarf-c	Other mutants: distorted leaves	
1	3						
2	12						
3	8						
4	10	2	0.14	2			
5	5	3	0.33		1		
6	26	4	0.13		1		
Massed seed lot	18	6	0.22			3	
	82	15	$\bar{X}$= 0.20	2	2	3	= 104

A chi-square analysis of the two progenies that segregate for both *c* and dwarf does not indicate independence, and further work is being done with the M_1 seed.

3-623: d allele (map position 2L-70)

ex 78L1101-142 (Medium Vigorous): 50% fruit set, normal plant diameter

This M_1 plant was one of 15 selected for further investigation in our fate-mapping study. All dwarf mutants segregate in progenies of fruits harvested from the first two primary branches (being first order divisions off the main stem), occurring at a frequency of 0.17 (41 of 242 plants), with the exception of a single mutant on branch 6 (fruit mutation frequency = 0.06). This is curious given the 2/5 phyllotaxy of tomato.

Kanwar, 1. S., E. A. Kerr, and P. M. Harney Linkage of *Cf-1* to *Cf-11* genes for resistance to tomato leaf mold, *Cladosporium fulvum* Cke.

Previous work (TGC 22:15-16 and TGC 27:14) indicated that several genes for resistance to *C. fulvum* exist. Linkage of the genes named from *Cf-1* to *Cf-11* has been tested in backcross populations with marker genes covering all chromosomes. Linkage deviations were determined by Chi-square analysis and cross-over values computed. Only those which showed significance are reported here in the table.

The data confirm the approximate locations of *Cf-1* to *Cf-4. Cf-1* is on Chromosome 1 at position 92. *Cf-2* is on 6 at 45. *Cf-3* is on 11 at 0 and *Cf-4* is on 1 at 94. The numbering on chromosome 11 will have to be revised as the position of *j-2* appears to be about position 11.

This study has determined the chromosomes on which *Cf-5* to *Cf-10* are located and gives a rough indication of their position. *Cf-5* is on chromosome 4 between *ful* and *e* at position 50. *Cf-6* is on 12 at 26. *Cf-7* and *Cf-8* are on 9 at 49 and 42 respectively. *Cf-9* is on 10 at 35. *Cf-10* is on 8 at 34.

Cf-11 is tentatively placed on chromosome 12 at approximately position 29. We also have suggestion of linkage with *marm* on chromosome 9. Further data are being obtained to determine which is correct.

Several other resistance genes have been tentatively located but tests for allelism are not yet completed. These results suggest that we have one more resistance gene on chromosome 1, 3 on 2, 2 on 3, 1 on 4, 1 on 5, 1 on 7, 1 on 8, and 1 to 3 on 11.

Linkage of Cf-1 to Cf-11 genes for resistance to tomato leaf mold, *Cladosporium fulvum*.

Gene	Line	P.I. no.	Gene marker	Segregation AB	Ab	aB	ab	N	Recombination % ± SE
Cf-1	Stirling Castle	270247	y	11	8	8	9	36	44 ± 8
			imb	14	4	3	15	36	19 ± 7
Cf-2	Vetomold	270254	pds	11	7	6	9	33	39 ± 9
			m-2	12	6	5	12	35	31 ± 8
Cf-3	V-121	270252	j-2	18	2	2	13	35	11 ± 5
			a	6	14	5	10	35	54 ± 8
Cf-4	P=135	370084	y	8	5	8	10	31	42 ± 9
			imb	9	3	1	13	26	15 ± 7
Cf-5	Ont 7717	187002	ful	12	6	5	9	32	34 ± 8
			e	14	3	4	12	33	21 ± 7
			ls	16	8	7	3	34	44 ± 9
Cf-6	Ont 7818	211839	alb	17	3	6	8	34	26 ± 8
			mua	14	5	2	12	33	21 ± 7
Cf-7	Ont 7517	124161	ah	14	4	4	10	32	25 ± 8
			marm	15	3	5	12	35	23 ± 7
Cf-8	Ont 7522	124161	ah	12	4	2	14	32	19 ± 7
			marm	14	3	7	9	33	30 ± 8
Cf-9	Ont 7719	126933	hy	17	6	3	10	36	25 ± 7
			h	13	9	2	12	36	31 ± 8
Cf-10	Ont 792	124161	var	8	3	5	7	23	35 ± 10
			gs	14	3	7	11	35	29 ± 8
Cf-11	Ont 7716	Mass no.2	alb	16	3	7	8	34	29 ± 8
			mua	12	7	3	12	34	29 ± 8
			marm	10	5	7	10	32	38 ± 9

Kanwar, J. S., E. A. Kerr, and P. M Harney Linkage of *Cf-12* to *Cf-24* genes for resistance to tomato leaf mold, *Cladosporium fulvum* Cke.

Previous work (TGC 22:15-16; 25:22; 27:14; 27:25; 28:18-19; 28:19) indicates that many genes for resistance to *Cladosporium fulvum* exist. The linkage relations of the genes previously named *Cf-1* to *Cf-11* have been reported by us in another Note in this Report.

Thirteen additional dominant resistant genes have been obtained from various accessions of primitive *Lycopersicon esculentum* and *L. pimpinellifolium.* Their uniqueness has been determined by tests for allelism and *they are now* named *Cf-12* to *Cf-24.*

This study has determined the approximate chromosomal location of all these genes. From the data, it appears that *Cf-12* is on chromosome 8 at position 31. This increases the known length of this chromosome and will require renumbering of the positions of the other 3 at positions 67 and 0 respectively. *Cf-16* and *Cf-17* are on chromosome 11 (very closely linked between *j-2* and *a*) at positions 22 and 20*. Cf-20, Cf-19* and *Cf-18* are on 2 at positions 50, 84 and 105 respectively. *Cf-21* is on 4 between *ful* and *e* at 45; *Cf-22* is on 1 between *br* and *u* at 15. *Cf-23* is on 7 and is tentatively placed at 36. If this position is confirmed, the locations of the genes on chromosome 7 will have to be revised. *Cf-24* is on 5 between *mc* and *wt* at 36 units from *mc*. Further tests are necessary to determine the exact locations of these genes.

Linkage of Cf-12 to Cf-24 genes for resistance to tomato leaf mold, Cladosporium fulvum Cke.

Gene	Line	P.I. no.	Gene marker	Marker line	Segregation AB	Ab	aB	ab	N	Recombination % ± SE
Cf-12	Ont 798	124161	l	LA1666	13	6	5	11	35	31 ± 8
			bu	LA1666	12	5	7	12	36	33 ± 8
			dl	LA1666	13	6	7	9	35	37 ± 8
Cf-13	Ont 7813	211839	j-2	72-2093-5	12	8	5	10	35	37 ± 8
			a	74-2166-2	11	7		12	30	30 ± 8
Cf-14	Ont 7814	211839	r	73-2014-149	12	5	9	10	36	39 ± 8
			wf	74-2166-2	11	3	7	13	34	29 ± 8
			sy	S73-5080	10	7	4	12	33	33 ± 8
			sf	S73-5080	11	5	12	5	33	52 ± 9
Cf-15	Ont 7910	211840	r	73-2014-149	10	5	3	9	27	30 ± 9
			wf	74-2166-2	11	8	3	6	28	40 ± 8
			sy	S73-5080	12	9	4	11	36	36 ± 8
Cf-16	Ont 7816	211840	j-2	72-2093-5	14	5	6	8	33	33 ± 8
			a	74-2166-2	12	8	4	10	34	35 ± 8
Cf-17	Ont 796	126947	j-2	72-2093-5	15	6	5	10	36	31 ± 8
			a	74-2166-2	10	6	7	13	36	36 ± 8
Cf-18	Ont 7518	126947	aw	73-2014	10	6	7	10	33	39 ± 7
			d	S74-2410	12	7	5	10	34	35 ± 8
Cf-19	Ont 7519	126947	s	S74-2410	12	6	6	8	32	38 ± 8
			aw	73-2014-1	12	6	3	15	36	25 ± 7
			d	S74-2410	16	2	3	13	34	15 ± 6
Cf-20	Ont 7520	126947	s	S74-2410	10	4	4	14	32	25 ± 7
			aw	73-2014-5	12	2	1	16	31	10 ± 5
			d	S74-2410	10	4	5	11	30	30 ± 8
Cf-21	Ont 7811	126947	clau	LA917	10	4	10	9	33	42 ± 9
			ful	LA917	10	4	3	13	30	23 ± 8
			e	LA917	12	6	5	13	36	31 ± 8
Cf-22	Ont 7812	126947	br	72-2093-5	14	2	3	13	32	16 ± 6
			y	74-2166-2	15	5	4	12	36	25 ± 7
Cf-23	Ont 7523	126947	var	S73-2093-5	10	7	4	9	30	37 ± 9
			gs	73-2014-149	13	6	8	9	36	39 ± 8
Cf-24	Ont 7819	126947	mc	74-2166-2	14	7	6	9	36	36 ± 8
			wt	72-2093-5	13	6	3	14	36	25 ± 7

Kesicki, E. The use of immunosuppressors in interspecific hybridization of tomato.

Bates and Deyoe (1973, Economic Botany 27) postulated the use of chemicals which suppress immunological reactions in animal tissue for breaking the incompatibility barriers in plants. The use of such chemicals was successful in cereals (Bates et al. 1974, Cereal Science Today 19). Present study indicates that immunosuppressors also give positive results in tomato, at least in these analyzed combinations: *L. esculentum* X *L. hirsutum* and *L. esculentum* X *L. peruvianum.*

L. esculentum cv. Potentate, *L. hirsutum* PI 308182 and *L. peruvianum* PI 126435 stocks were used. Flowers of *L. esculentum* were emasculated and pollinated with the other species before treatment. The treatments were carried out once a day for 14 days after pollination.

The best results were obtained with Cuprenil in 0.05% solution with the addition of DMSO. This treatment distinctly increased the mean number of hybrid seeds per fruit, the percent of seed germination, and the mean number *of* hybrid plants per fruit in the test combination *L. esculentum* X *L. hirsutum* (see table).

Applications of Cuprenil were also successful in crosses of *L. esculentum* and *L. peruvianum.* After treatment of plants with Cuprenil, 43 F_1 hybrids and many seeds of BC_1 to *L. esculentum* were obtained.

Effect of application of Cuprenil and DMSO on hybridization of L. esculentum and L. hirsutum.

Treatment	Percent of fruit setting	Mean number of seeds per fruit	Percent of seed germination	Mean number of hybrids per fruit
Control (H_2O)	71.88	36.21	2.24	0.81
Control (DMSO)	72.73	49.03	1.27	0.62
Cuprenil 0.05	77.08	37.79	1.80	0.68
Cuprenil 0.1	60.00	56.97	2.34	1.33
Cuprenil 0.05 + DMSO	68.00	57.21	6.72	3.84
Cuprenil 0.1 + DMSO	68.18	44.09	3.05	1.34

Lambeth, V. N., and P. Byrne Inheritance of pericarp firmness in tomato.

In 1977 research was initiated to select tomato lines of value in breeding pericarp firmness, to determine the mode of inheritance of this trait and to develop breeding lines and cultivars with increased firmness.

Thirty entries, including 12 F_1 hybrids having at least one firm parent, 15 inbred lines (parents), 2 slow-ripening mutants (*nor* and *rin*) and one firm-fleshed cultivar Fla. MH-1, were planted in a completely randomized block design with 4 replications. Fruits were harvested at the breaker stage on 5 dates in July and August. Half of the fruit from each harvest was tested for firmness the following day and half was stored for 7 days at 21^{o}C. Mean firmness values before and after storage and mean change in firmness were determined for each entry. Heritability estimates were made by regression analysis of offspring on MP means. Tests were also male for heterosis.

Firmness means at breaker state varied from a high of 1.8658 kg/0.6 cm^2 for STEP (USDA 73B696) to a low of 0.7600 kg/0.6 cm^2 for MO. 31-Y-49A, a soft breeding line. Storage diminished the differences in firmness; however, entries that were firm as "breakers' tended to be firm after storage. Inbred lines that appeared to be good parental lines for firmness were USDA 73B696, Fla. 1011, Mo. P1571, Md. 101 and Fla. MH-1.

Mean fruit firmness decreased as the season progressed. Heritability estimates by regression analysis were 91°P% at the breaker stage and 67% after storage for 7 days at 21^{o}C. These high estimates indicate a major contribution of genotype in the expression of firmness. Since the regression coefficient measures narrow sense heritability, additive genetic variance played a larger role than dominance or epistatic interactions. For the most part, firmness values of hybrids fell close to the MP values: however, two hybrids (entries 4 and 10) were found firmer than the firm parent in common (entry 17, STEP 1018). The general absence of heterosis was compatible with the high heritability estimates; both indicate that the dominance effect was small. The distribution of segregates in the F_2 and BC generations of the firm-fruited hybrid SHOW-ME is currently under way.

Lamm, R. L. Application of Giemsa and silver staining to *L. esculentum.*

Kryotypes, with up to eight additional 2S 2S reduced isochromosomes with subterminally located NOR regions but lacking satellites, have been raised by C. F. Quiros (TGC 26:11-12, 1976). He has kindly supplied me with seed of his material [No. 762 (134-8)] . For comparison, I have used diploid plants of the F_1 cultivar Sonata.

When applying the Giemsa C-banding technique to mitotic studies I found that both normal and reduced 2S arms stained intensively, appearing as large, spot-like C-blocks. In the 2S 2S chromosomes, these blocks were fused to single spots. These heterochromatic blocks showed up as chromocentres in the interferes nuclei. Endochromocentres were found in some nuclei from squashes of young ovules. Consequently, endomitotic divisions appeared showing diplochromosomes within the nuclear membrane and with the nucleolus still persisting.

Using the C-banding technique proposed by G. E. Marks {Chromosoma 49:113-119, 1974), the 2S arms could be clearly distinguished at all stages of meiosis. At M I of meiosis, the isochromosomes appeared as univalents which were dividing either at the firs or second division. Different opinions concerning the formation of chiasmata in the 2S arms have been given. From this point of view, it would be interesting to study the chromosome pairing in 4n plants by aid of the Giemsa technique.

In mammalian chromosomes, discrimination between silent and active NOR's is possible by using the silver nitrate staining technique. Since my attempts to stain the NOR's of *Prism sativum* have been successful (Lamm, unpubl.), I have applied the same technique to the tomato but so far in vain. With silver nitrate, however, the nucleoli are stained intensely. Another point of interest is that, whereas the NOR's of the 2S•2S chromosomes are almost silent in the mitotic chromosomes, they seem to be active at the late stages of meiosis; but this observation has to be confirmed by further investigations.

Lesley, J. W., and M. M. Lesley Linkage of *sh* (sherry).

The flesh color mutant sherry (*sh*) originated from seeds of the variety Canary Export exposed to ionizing radiation [Zscheile, F. P. and J. W. Lesley, J. Heredity 58 (4)]. Sherry (*sh*) is recessive and non-allelic to yellow flesh (*r*) apricot (*at*) and tangerine (*t*). It is extremely unfruitful. From self pollination 10 fruitful plants were *sh* and 240 plants were unfruitful. In a backcross in a greenhouse in winter at Riverside, California, however, 16 were sh^+ (red fruited) and 18 were *sh.* As a rule *sh* plants differ from the parent variety in having almost entire leaflets (*ent*) compared with the normal dissected condition, and in the frequent production of lateral shoots (*lat*) in young plants. Also *sh* has fewer flowers and more locule in the ovary (Lesley, J. W. d M. M. Lesley, 1971 TGC Z 1). Sherry is closely associated with *ent* and *lat.* In backcrosses of sh^+ ent^+ lat^+/*sh ent lat* x *sh ent lat,* 18 sh^+ plants had normal leaflets and laterals, ent^+ lat^+, one was *ent lat* and one was ent^+ *lat.* Twenty-five *sh* plants were *ent lat,* two were *ent* lat^+ and 123 were unfruitful. Recombination between *sh* and *lat ent* was 9 percent, apparently due to crossing over. About 5 percent recombination occurred between *lat* and *ent*.

Based on the close association with *sh, lat* and *ent* were used as indicators of *sh.*

Virescent tangerine (t^v) is an allele of tangerine flesh (*t*) in chromosome 10. Another allele at this locus was recently reported (Kerr, E. A. 1979, TGC 29). Virescent tang rive s easily recognized in young seedlings. Three F_2 families from the same P_1 sh^+ *d sn* t^v x *sh* d^+ sn^+ t^+ with *sh* and t^v in repulsion (trans) contained 228 plants. Laterals (*lat*) and the combination *lat-ent* were used as indicators of *sh.* By the Product Method, in all three families together *sh* and t^v are linked and 30 cM apart, assuming 3:1 ratios for t^v and *lat-ent* (Table). The difference in the cross over values of *lat* t^v and *lat-ent-*t^v may be due to a difference in the map position of *lat* and *ent.* Supposing an increase in the standard error of the linkage from 6 to 10 percent, linkage between *sh* and t^v is 30 + 10 cM and is still significant. Only the repulsion (trans) phase has been tested. As previously noted (Lesley, J. W. and M. M. Lesley, TGC 21, 1971), meiosis in the pollen mother cells of F_1 sh^+ x *sh* usually was normal with 12 pairs of chromosomes, but one pair often had an unpaired region indicating an inversion in the heterochromatin of the long arm of chromosome 10 (Figure). The data suggest that *sh* is in chromosome 10 and that several closely linked loci were changed by the ionizing radiation, possibly by an inversion.

Medina-Filho, H. P. Linkage of *Aps-11, Mi* and other markers on chromosome 6.

Fig. Asynapsis in chromosome 10.

The possibility of using $Aps\text{-}1^1$ to screen for nematode resistance (TGC 24:25; Act. Hort. 100, in press) has stimulated further investigation on its relationship to other genes of chromosome 6. A linkage test has been performed using LA1178, a marker stock for the long arm of chromosome 6. In addition to the morphological markers *yv coa c,* this stock proved to carry $Aps\text{-}1^+$ and Mi^+ (nematode susceptibility) thus being appropriate for linkage analysis in crosses with Short Red Cherry H, a nematode resistant line selected from VFNT Cherry by A. Millet. Since LA1178 is hairless and devoid of anthocyanin (*a-hl*; chr. 11), the segregations for these two loci were also recorded.

A test cross population of 1,143 plants was scored for *yv* and genotyped for *Aps-I.* Among them, 517 plants were also scored for *coa c a* and *hl.* Another sample consisting of 250 *yv* plants and 263 + was subjected to nematode infestation and scared for resistance. Additional scoring for *yv* and *Aps-1* was performed on 2,224 *yv*- plants of an F_2 population from the same cross. Summing up the BC and F_2, a total of 5,591 gametes were analyzed for *yv* and *Aps-1.*

A summary of results is presented in the Table. In general, the relative map distances between *yv, coa* and *c* conform with previous data. The same is true for *a-hl*. As expected, they show independence from chromosome 6 markers.

Among 513 BC plants scored for nematode resistance, all the green plants (yv/+) were free from galls except one which developed a few, tiny galls at the tip of the roots. This plant was then transplanted to a pot with additional nematode inoculum and grown to maturity, revealing no change in the severity of the symptoms. Its progeny segregated for susceptible *yv* (associated with *Aps-1*$^+$) end resistant + (associated with *Aps-1*^{1}) thus ruling out the possibility that the original plant was a recombinant between *yv* and *Mi.* Among the 250 *yv* plants, 5 were free from galls. Using the same approach as above, two developed galls at maturity, one died after transplanting and the other two which remained free from symptoms proved by progeny test to be susceptible. Therefore no bona fide recombinants were recovered. Likewise, all the *yv* (BC's and F_2's) were *Aps-1*$^{+/+}$ while the green segregants (BC only) were *Aps-1*$^{+/1}$. Despite the lack of recombination, since there exist susceptible *yv* and + genotypes, resistant *Aps-1*$^{+/+}$, susceptible *Aps-1*$^{+/+}$, there is little doubt that *yv*, *Aps-1* and *Mi* are three distinct genes, and thus pleiotropy by a single gene is unlikely. The results of this test indicate, however, that these genes are so tightly linked they map at the same locus.

Previous data by Gilbert (TGC 8:15-17) suggested a distance of 1-2 cM between *yv* end *Mi*. Two possibilities may account for this discrepancy: a) Gilbert's recombinants might have been escapes since no progeny tests were performed; b) natural heterogeneity of recombination values. That the latter does occur is a well established fact, yet the causes are poorly understood according to Butler (Can. J. Genet. Cytol. 10:866-892; 19:521-529). Since all the Hawaiian lines (HES) analyzed earlier, including a few lines from J. C. Gilbert, carry *Aps-1*$^+$ (Act. Hort. 100: in press), we could assume that the specific line used in Gilbert's linkage analysis of *yv-Mi* was *Aps-1*$^+$. The *Mi Aps-1*$^+$ lines originated from a crossing over between *Aps-1*^{1} and *Mi,* end the adjacent genetic material of *L. peruvianum* introduced with *Mi* and *Aps-1*^{1} might be present to a less extent in those HES lines. Therefore, the chromosome homology of that specific region with the corresponding region of *L. esculentum* is probably greater in the *Aps-1*$^+$ resistant lines than in those carrying Aps-1^1. It is noteworthy that studies of induced deficiencies indicate that *yv* is located in or very near the proximal heterochromatin on 6L (Chromosoma 23:452-454). It is possible that *Aps-1*^{1} lines also carry part of the heterochromatin of *L. peruvianum* resulting in reduced homology and pairing at that particular chromosome section which would be the major factor preventing the recombination. As far as is known the genomes of the *Lycopersicon* species are homosequential, and the only marked morphological differences are in the proximal heterochromatin of some interspecific hybrids where pairing is sometimes disturbed (Proc. 10th Int. Bot. Congr. p. 222). Thus, the absence of recombination on the proximal region due to alien heterochromatin is conceivable. Despite the inherent difficulties of detecting small differences in chromosome structure, a cytological study of meiosis in *Aps-1* heterozygotes would be required to corroborate this hypothesis. If it is true that the *L. peruvianum* heterochromatin is repressing recombination, the most logical gene order in 6L would be *yv Aps-1 Mi*. This would explain the occurrence of recombinants between *yv* and *Mi* observed by Gilbert since his *Mi* materiel was probably *Aps-1*$^+$ end the corresponding *yv* and heterochromatin of such lines would be that of *L. esculentum.* Such an arrangement would allow intimate pairing and the opportunity for crossing over. Evidence, however, to prove such a hypothesis is as yet lacking. Other possible causes for heterogeneity in recombination values referred to in the literature are differences in genetic background, environment, sex, cytoplasm end age of plant. Differences in the genetic background could be e factor since the crosses involved two genetics backgrounds. The other factors mentioned, however, are not likely causes since: a) BC and F_2 progenies were produced in two different greenhouse environments, one of them under ideal growing conditions and the other having a wide range of temperature variation. In addition, F_2 populations were also produced in the field; b) sex and cytoplasm are unlikely causes because BC and F_2's comprised the reciprocals; and c) regarding age, F_2 plants analyzed were produced from F_1's up to one year old.

On the basis of 5,591 gametes analyzed for *yv* and *Aps-1,* the estimates of maximum map distance between them is 0.00082 cM calculated at the 0.01 probability level, and the distance between (*yv, Aps-1*) and *Mi,* 0.00894 cM, based on 513 plants.

For practical breeding purposes, absence of recombination on the *yv Aps-1 Mi* region is welcome since in the electrophoretic technique the selection is made for *Aps-1*^{1} and consequently for *Mi.* The results obtained show that unquestionably this procedure of screening for nematode resistance based on *Aps-1*^{1} is remarkably reliable. Although the possibility of a crossing over between *Aps-1*^{1} and *Mi* is remote, a direct test with nematodes in the last stages of the breeding programs would detect such an event.

Table. Estimates of recombination values of F_2 and test cross populations of the cross *yv Aps-1*$^{+/+}$ *Mi*$^+$ *coa c a hl* X + *Aps-1*$^{1/1}$ *Mi ++++.* Values calculated with pooled data of reciprocal F_I's.

Gene pair	Population	No. plants	Recomb. fraction p ± .02	Marginal cont. χ^2	Significance
yv coa	BC	517	.40	20.99	.0000
yv c	BC	517	.46	1.48	.2240
yv Aps 1	BC	1143	p ≤ .00082		
	F_2	2224			
(yv, Aps-1) Mi	BC	513	p ≤ .00894		
coa c	BC	517	.32	50.27	.0000
(yv, Aps-1) a	BC	517	.50	.00	1.0000
(yv, Aps-1) hl	BC	517	> .50		
coa a	BC	517	> .50		
coa hl	BC	517	> .50		
c a	BC	517	.47	1.04	.3071
c hl	BC	517	.49	.00	.9622
a hl	BC	517	.36	34.45	.0000

Oleszek, W., S. Shannon, and R. W. Robinson Glycoalkaloid composition of *Solanum* species of interest for tomato breeding.

Glycoalkaloids have been of interest due to their possible role in insect and disease resistance, and have also been of concern to potato breeders because of the toxic level of glycoalkaloids in a potato cultivar derived from an interspecific cross with a wild *Solanum* species. The kinds and amounts of glycoalkaloids of *Solanum* species that can be crossed with the tomato, however, have not been established yet.

Solanum pennellii, S. lycopersicoides and their hybrids with the tomato were compared to *L. esculentum* for foliar glycoalkaloid composition. *S. lycopersicoides,* like the tomato and all other *Lycopersicon* species, has tomatine as its sole glycoalkaloid constituent. The level of tomatine in the leaves of *S. lycopersicoides,* however, *was 7* times higher than in the tomato. The intergeneric hybrid was intermediate in tomatine content. *S. pennellii* also contained tomatine, but at a much lower level than in the tomato. The low tomatine content of *S. pennellii* is a recessive trait.

Pilowsky, Vii. Studies on the reaction of *Tm*-2^a/+ plants at high temperature.

In many tests when tomato lines heterozygous for the *Tm-2*^{a} gene for resistance to tobacco mosaic virus (TMV) were inoculated and grown at temperatures above 28^{o}C, two types of symptoms, local reaction and systemic necrosis, were observed. The present study was undertaken to test the possibility that the observed segregation in the response of plants of genotype *Tm-2*^{a}/+ to TMV at high temperature could be the result of genetic differences in the parental material.

In this work, the cultivar Marmande was used as the susceptible parent and line 825, a TMV-homozygous resistant (*Tm-2*^{a}/*Tm-2*^{a}) version of Marmande, was used as the resistant parent. Herein, Marmande and line 825 are respectively referred to as 'Marmande Susceptible' and 'Marmande Resistant'. Crosses were made between 'Marmande Resistant' and 'Marmande Susceptible', and the F_1 hybrid was selfed and backcrossed to 'Marmande Susceptible'. 'Marmande Susceptible' served as the female parent in each cross. Seeds from crosses between different plants were collected separately and self-pollinated seed was harvested individually from plants in parent and F_1 generations and saved as families.

Both cotyledons of 2-wk old plants from different generations were inoculated with a TMV isolate of strain 0 in a greenhouse chamber at 20-21^{o}C. Immediately after inoculation, plants of each line were placed in two growth-chambers at 30-31 and 20-21^{o}C (control) with a 14-hr photoperiod. The final disease record was taken 6-12 wk after inoculation.

At 30-31^{o}C, 63 to 72% of the F_1 plants reacted systemically (Table 1). The F_1 progenies showed only the local reaction at 20-21^{o}C, as was expected. None of the self-pollinate progenies of the resistant parents developed systemic symptoms at either temperature regime.

When F_2 and BC_1F_1 lines derived from individual F_1 plants with each of the phenotypes occurring at high temperature (local reaction and systemic necrosis) were inoculated and incubated at 30-31^{o}C, three classes - local reaction, systemic necrosis, and mosaic - were observed. In each of these generations, the incidence of systemic necrosis in lines derived from necrotic (systemic reaction) and non-necrotic (local reaction) F_1 plants was found to be similar. At 20-21^{o}C, the F_2 and BC_1F_1 lines segregated for local reaction and mosaic in ratios of 3:1 and 1:1, respectively, as was expected. Thus, no evidence was obtained that the occurrence of two types of symptoms in plants of genotype *Tm-2*^{a}/+ at high temperature was the result of genetic differences in the parental material. Furthermore, segregation for local reaction and systemic necrosis was also found to occur in vegetatively propagated populations (clones), each derived from a different F_1 (*Tm-2*^{a}/+) plant.

The mechanism of localization of TMV infection in *Tm-2*^{a}/+ plants could be overcome, i.e., systemic necrosis occurred, if larger numbers of virus particles were introduced into the cotyledons by repeated inoculations prior to their transfer to high temperature. It is therefore concluded that the absence of systemic necrosis in some of the *Tm-2*^{a}/+ plants which were inoculated with TMV only once was due to the fact that the amount of virus introduced into the cotyledons by rubbing was less than the minimum required for the development of systemic symptoms.

Table. Reaction of F_1 hybrid tomato plants and self-pollinated progenies of parental plants to tobacco mosaic virus at two temperature regimes.

		30-31 C				20-21 C			
		No. of	Disease reaction (% plts.)			No. of	Disease reaction (% plts.)		
Family number	Line or cross*	plants	Local	Systemic necrosis	Mosaic	plants	Local	Systemic necrosis	Mosaic
1	MR-1 ⊗	60	100	-	-	40	100	-	-
	MS-1 ⊗	60	-	-	100	40	—	-	100
	MS-1 x MR-1	55	31	69	-	75	100	-	-
2	MR-2 ⊗	73	100	-	-	78	100	-	-
	MS-2 ⊗	38	-	-	100	40	-	-	100
	MS-2 x MR-2	75	31	69	-	97	100	-	-
3	MR-3 ⊗	93	100	-	-	80	100	-	-
	MS-3 ⊗	40	-	-	100	39	-	-	100
	MS-3 x MR-3	47	30	70	-	79	100	-	-
4	MR-4 ⊗	40	100	-	-	38	100	-	-
	MS-4 ⊗	40	-	-	100	38	-	-	100
	MS-4 x MR-4	54	37	63	-	83	100	-	-
5	MR-5 ⊗	79	100	-	-	40	100	-	-
	MS-5 ⊗	39	-	-	100	40	-	-	100
	MS-5 x MR-5	67	28	72	-	82	100	-	-

*MR = 'Marmande Resistant'; MS = 'Marmande Susceptible'; ⊗ = Self-pollinated progeny.

Rao, R. N., and Panuganti N. Rao A chromosomal variation associated with susceptibility to lady bird beetle.

In M_1 generation of gamma-ray treated tomato cv. Marglobe, one plant had an extra small chromosome and a translocation complex of 4. The chromosomes involved in translocation could be arbitrarily numbered as 1.2, 2.3, 3.4 and 4.1. The chromosome 4.1 was conspicuously small and was believed to be deficient for a large heterochromatic segment. The extra chromosome, which was smaller than 4.1, formed together with these 4 chromosomes a ring of 5 in some plants in subsequent generations, and it was considered to be an isochromosome for the short arm having little heterochromatin. It was designated as 3.3. The plants in M_2, M_3 and M_4 generations showed a wide array of genomic constitutions and segregated for susceptibility to lady bird beetle (*Henosepilachna vigintioctopunctata*). The segregation did not, however, follow any set pattern. Compared to the normal resistant plants, the susceptible ones had smaller dark green glossy leaves with an uneven surface and there was a marked decrease in number of trichomes (both uni- and multicellular) per unit area and considerable numbers of glandular hairs (with tetrahedral heads) were present an the leaf surface. The cytogenetic analysis revealed that the susceptibility is governed by a dominant mutation arising during the course of the reciprocal exchange of segments between nonhomologous chromosomes. The lack of clear-cut monogenic segregations was believed to be due to preferential pairing of chromosomes (1.2, 1.2) in certain constitutions (1.2, 1.2, 3.4, 1.4, 3.3 in the following situation, where, as frequently observed, pairing occurred as a bivalent and heteromorphic trivalent). The chromosomes were directly oriented at meiosis (1.4 and 3.3 in the trivalent going to the same pole frequently); the abnormal gamete (with 1.4 and 3.3) segregated preferentially into a functional megaspore during megasporogenesis; and certain gametes (carrying deficiencies in euchromatin, presumably in chromosome 3.2) were inviable. All of these circumstances led to the nonrecovery of the expected genotypic constitutions in the progeny.. But invariably the susceptibility was found whenever the smaller translocated chromosome (1.4, on which this supposed dominant mutant gene was located: and which can be identified by its size and multivalent formation) was present in the complement, highlighting that the inheritance of the susceptibility reaction followed that of the translocated chromosome.

Rao, R. N., and Panuganti N. Rao Pachytene chromosome pairing in autotetraploid tomato.

In autotetraploid tomato cv. Marglobe, pachytene pairing in individual chromosome sets was analyzed to facilitate an understanding of the relationship between chromosome length, extent of heterochromatin and centromere, and the frequency and localization of partner exchanges. There were interchromosomal differences in the frequency of partner exchanges in the three regions of the chromosome (heterochromatin, euchromatin and centromere). Though the exchanges were distributed all along the, chromosome, the short chromosomes, such as 10, 11 and 12, had predominantly centric exchanges, but such exchanges were not frequent and were even absent in some chromosomes, 2, 4 and 8, in which they were more frequently in eu- or heterochromatic regions.

The exchanges were more often localized in proximal than in distal regions of the chromosomes. They also occurred more frequently in euchromatin than in heterochromatin which might be due to the greater proportion of euchromatin. The number of exchanges per set varied from 1 to 2. The occurrence of two exchanges was as frequent in medium-long chromosomes, such as 7 and 8, as in long chromosomes, such as 1 and 3, but was not found in short chromosomes.

The four homologues of chromosome 2 (the nucleolus organizer) were stuck together most of the time in the heterochromatic short arm and many times also at the centromere and heterochromatin of the long arm. On the basis of multivalent formation by this chromosome at diakinesis, such associations between centromeres were considered not to involve a partner exchange (Rao and Rao, 1978). But in the rest of the chromosomes, the centric associations also were taken to represent exchanges, otherwise the multivalent frequency per cell realized at diakinesis and metaphase I cannot be accounted for.

The results in the present study are not in complete agreement with those of the earlier investigation (Gottschalk, 1955). The differences are believed to be due to genotypic differences between the varieties involved in these studies.

Rick, C. M. Further delimitation of the centromere of chromosome 11.

Thanks to the large population of genes and the availability of useful aneuploids, good progress has been made in the localization of the centromere on the linkage map of chromosome 11. The last contribution in this series was made by Carl Clayberg (TGC 22:5), who delimited *ms-12* to the short arm by the modified ratio technique with the tertiary trisomic 2n + 7S*11L. This discovery confined the centromere to the interval between *ms-12* and *a*, in terms of the present map, between positions 58 and 68. Since the only her locus in this interval is that of *yg-6,* we utilized the same technique with the same trisomic with the following results.

The cross was made between 2n + 7S*11L and *yg-6,* and several trisomics were identified in the F_1. The latter were selfed and the F_2 was produced with the following segregation: 145 2n+, 26 2n *yg-6,* 13 trisomic +, 5 trisomic *yg-6* *As* expected, the ratio of *yg-6* segregation amongst diploids is not modified because, even if the segregation were trisomic, no viable haploid gametes can transmit the translocated chromosome. Trisomic segregation should, however, be detected amongst the trisomic progeny if the gene were located on the long arm. Since the segregation is normal and significantly different from the all vs. none expected of trisomic segregation, the gene cannot be situated on the long arm, hence has to reside on the short arm. The centromere is thereby delimited to the *yg-6* - *a* interval, i.e. between positions 61 and 68.

Rick, C. M. Petroselinum (*Pts*), a new marker for chromosome 6.

L. cheesmanii f. *minor* is characterized by highly compound leaves (see front cover). In F_2 f. *minor* X *L. esculentum* and various BC derivatives of this cross, the progenies clearly segregate for this character vs. normal. For such segregations, which we have observed repeatedly, the following data are typical. Crosses were made between cv. VF 36 and four accessions of f. *minor* (LA 530, 532, 930, and 1136); 2 backcrosses to VF 36; and selfs of compound leaved segregants. Since segregation in each family was similar, the data were pooled to yield the totals of 53 normal, 118 intermediate, and 56 compound. The fit to 1:2:1 is good, as manifest in the x^2 (0.426). The compounding of leaf segments to 3rd and even 4th order is clearly expressed in the homozygotes, and the intermediate phenotypes obviously deviate from normal. The evidence therefore indicates the activity of an incompletely dominant gene, which is designated Petroselinum (*Pts*) for the resemblance to plain parsley foliage.

Since *sp* segregated in all families, it was also scored with the following dual segregation:

	+/+	+/Pts	Pts/Pts
+	7	100	54
sp	46	18	2

This segregation deviates markedly from random and indicates linkage between *Pts* and *sp*. A maximum likelihood test by Steve Tanksley provides an estimate of 12.5 cM for the *sp-Pts* interval. Without a 3-point test or other data, I cannot be certain of the locus of *Pts* except that it certainly lies on 6L.

Robinson, R. W. Pleiotropic effects of the *j-2* gene.

The jointless-2 gene is being used increasingly by tomato breeders. It provides resistance to premature separation and loss of fruit during mechanical harvest and increases the proportion of stem-free fruit. Jointless-2 cultivars have been developed which do not have the delayed and poor concentration of maturity found by Emery and Munger (J. Am. Soc. Hort. Sci. 95:407-41.0, 1970) to be associated with *j-2*

The *j-2* gene was backcrossed to New Yorker to develop isogenic lines. Selfing for 3 generations after the sixth backcross resulted in a *j-2*/*j-2* line identical to the recurrent parent and in a homozygous jointless-2, essentially isogenic, line.

Although *j-1* reduces the number of flowers per inflorescence, *j-2* has the opposite effect. The jointless line had an average of 45.8 flowers per inflorescence, compared to 6.1 for the normal counterpart. The superfluous flower production did not increase fruit production, however, since fruit set was reduced by *j-2*. Only 1.4 fruit per cluster developed on *j-2* plants, in contrast to 6.1 for the + line, an average fruit set on the first two clusters of 3.1% for the jointless and 52.5% for the jointed line. The anthers of the *j-2* line were often not tightly united around the style, possibly reducing fruit set by restricting pollination.

Leaves occasionally developed in inflorescences of the *j-2* but not the + line, similar to the effect that Rick and Sawant (Proc. Am. Soc. Hort. Sci. 66:354-360, 1955) noted was produced in *sp* plants by *j-1* and other genes affecting development of the abscission layer. Earliness was delayed and yield reduced by *j-2*. The fruit of the jointless line differed from normal by being larger, flatter, rougher, and catfaced, and having more tightly attached stems and larger sepals, stem scars, and cores.

Adverse effects of the *j-2* gene can be modified by breeding. Breeders have developed *j-2* cultivars without excessive flowers per inflorescence, poor fruit set, and malformed fruit. But their success does not appear to be due to crossing-over, separating *j-2* from closely linked undesirable genes. When jointless-2 cultivars with normal inflorescence and good fruit set and type were used as parents, there was an association in segregating generations between *j-2* and excessive flower number, poor fruit set, and rough fruit. In developing the parental *j-2* cultivar, the adverse effects were evidently prevented not by crossing-over but rather by an independent modifying factor epistatic to the undesirable pleiotropic effects of the *j-2* gene.

One such modifying gene is *o*. Segregants from *o* X *j-2* crosses that were recessive for both of these genes all had a good set of smooth fruit, and they did not have the large stem scar and radial cracking that was associated with all the *j-2* o^+ plants, including the few with otherwise good fruit type. Other genes also modify the adverse effects of the *j-2* gene, since breeders have developed *j-2* o^+ cultivars, such as MH-1, with good fruit set and type.

Schiavi, M., B. Campion, and G. P. Soressi. Allelism test between torosa^2 and blind mutants.

The mutant torosa^2 (*to*^{2}) described by Stubbe (TGC 17:10) proves to be particularly interesting for breeding tomato varieties suitable to high density population and mechanical harvesting (see Campion TGC 30). Phenotypically torosa^2 appears quite similar to blind (*bl*) (TGC 9:9). Both the mutants, in fact, show very few lateral shoots, 1-3 fruits per truss and often stop growth after the first or second inflorescence; a peculiar feature is the high frequency of flower and fruit fasciation.

To test their possible allelism, torosa^2 (cv. Lucullus) was crossed with 3 different stocks of blind: 1 from Rick and 2 from Darby. The F_3 progenies examined, however, were restricted to those originated by the F_2 family from the cross with the blind source from Rick. The results obtained are given in tables 1-4. All the F_1 plants were sp^+ and exhibited 1-6 lateral shoots. In the F_2 progenies there were phenotypes without lateral shoots, with 1-6 lateral shoots, and undistinguishable from normal.

The analysis of each F_3 family from individual F_2 plants evidenced the appearance of like normal phenotypes from blind, non-blind, and apparently normal F_2 plants. These results strengthen the hypothesis that the two mutants are allelic to the same *bl* locus but each of them possesses at least 1 modifer gene, whose action determines a wide variability ranging from blind to apparently normal phenotypes.

The expression of the bl gene as far as the number of lateral shoots, the cessation of growth, and the flower and fruit fasciation are concerned, is, besides, influenced by other genes (*sp, d,* etc.) and by environmental conditions (temperature, nutrition and light).

Such indications point out the importance of the cross material and selection when torosa^2 or the blind mutant is utilized for breeding purposes.

Table 1. Frequency (%) of plants with different numbers of lateral shoots: 0 lateral shoots, 1-6 lateral shoots, like normal plants (N).

Mutants and progenies	No. of plants	Lateral shoots 0	1-6	N*
to^2	14	6.7	93.2	0.0
bl	10	10.0	90.0	0.0
F_1	60	0.0	100.0	0.0
F_2	358	39.0	55.3	5.7

* = undistinguishable from normal.

Table 2. Frequency of five classes of F_3 phenotypes for each F_2 class of plants with different number of lateral shoots.

F_2		F_3				
Classes	Plants	Classes of phenotypes				
	%	0	1-2	3-4	5-6	N*
0	51.9	33.2	28.2	10.9	5.5	22.2
1-2	22.2	12.8	45.0	25.9	6.2	10.0
3-4	3.7	6.2	30.5	46.0	10.5	6.8
N*	22.2	1.7	3.1	6.9	8.3	80.0

* = undistinguishable from normal.

Table 3. Frequency of blind, non-blind and undistinguishable from normal phenotypes for the mutants and the subsequent progenies (F_1, F_2).

Mutants and progenies	Total plants	Plant phenotype		
		Blind	Non-blind	Like-normal
$\underline{to}^2$	14	42.8	57.1	0.0
$\underline{bl}$	10	80.0	20.0	0.0
F_1	60	65.0	35.0	0.0
F_2	358	68.3	26.0	5.7

Table 4. Frequency (%) of F_3 plants with blind, non blind and like normal phenotypes within the corresponding F_2 parental class.

Progenies	Blind			Non-blind			Like-normal		
F_2	76.5			5.9			17.6		
	Blind	Non-blind	Normal	Blind	Non-blind	Normal	Blind	Non-blind	Normal
F_3	57.6	25.3	17.1	31.3	48.7	20.0	14.4	5.2	80.4

Stoeva, P. Overcoming unilateral incompatibility of *Solanum pennellii.* (submitted by C. Daskaloff)

Overcoming the unilateral incompatibility of *S. pennellii* is of particular importance for studying cytoplasm cytoplasmic-nuclear relations between *pennellii* cytoplasm and the genomes of species of *Lycopersicon.* In this respect in the two successful crosses *S. pennellii* x *L. hirsutum* f. *glabratum* and *S. pennellii* (tetraploid) x *L. peruvianum* (diploid), no cytoplasmic-nuclear interactions *were* observed.

Breaking the unilateral incompatibility of *S. pennellii* was accomplished in two ways: a) by a bridge hybrid containing cytoplasm of *S. pennellii* and genetic material from both *S. pennellii* and *L. esculentum;* b) by using as a bridge the hybrid proposed by Martin (TGC 16) of *S. pennellii* x *L. hirsutum* f. *glabratum.* Realization of the second hybrid was easier, but it was less successful as a bridge because the genetic material from f. *glabratum* impedes the crossing with species of the subgenus *Eulycopersicon.* When species of the latter subgenus are used as male parents, the only successful cross was BC_1-P_2 (*S. pennellii* x *L. hirsutum* f. *glabratum*) x *L. pimpinellifolium.* For this reason we concentrated on the first bridge hybrid, which was obtained in the following way. Flower buds of *S. pennellii* (LA716 Atico) were pollinated with F_2 and BC_1-P_2 hybrid plants of the cross *L. esculentum* x *S. pennellii.* Seven plants were grown whose hybrid character was determined by the changed pedicel ratio. These plants were used as female parents in crosses with different varieties of *L. esculentum* and different generations (F_1, BC_1-P_1, BC_2-P_2) of the *esculentum-pennellii* cross. Such crosses succeeded only with the F_1 as pollen parent. Thus the bridge hybrid had the constitution *S. pennellii* (Atico) x F_2 (or BC_1-P_2) x F_1 x F_1. It was crossed as female parent with: *L. esculentum* (3 varieties), *L. cheesmanii* var. *typicum, L. cheesmanii* var. *minor,* and *L. pimpinellifolium.* Fruit set was 10.26-16.67% per pollinated bud. The hybrid plants of all of the crosses showed high (seed) fertility and low pollen sterility (5-52%; mean = 22%).

Tanksley, S. D., and C. M. Rick Prospects for the use of isozymes for legal purposes in tomato breeding.

Isozymes and other protein markers are now being used to identify for legal purposes specific cultivars in a number of crop species. Allozymes (isozymes encoded by different alleles at the same locus) can be distinguished without ambiguity by simple electrophoretic techniques. They can thereby be utilized as unequivocal markers of varieties in place of morphological characters, which are often subject to environmental influence. The question has naturally arisen about the potential use of such enzyme markers for direct identification of tomato cultivars. In our laboratory, variation in the tomato and its close relatives has been studied, utilizing more than ten different enzyme systems, accounting for more than 30 loci. The results are not encouraging for those hoping to find existing differences between cvs. For the most part, all U. S. and European cultivars examined are indistinguishable electrophoretically. The exceptions are most nematode-resistant cvs. (derived from *L. peruvianum*) which carry *Aps-1*^{1}, several British forcing cvs. which have *Est-1*^{1} (probably derived from *L. pimpinellifolium* in breeding for leaf mold resistance), and Stone, John Baer, Marmande, and several other older Euopean cvs. which are fixed for *Prx-4*^{7}. The remaining ones -- the great majority -- share the same zymotype for all tested electrophoretic loci. Although our sample of enzymes does not by any means exhaust the full reportoire of systems amenable to electrophoresis, the results should be indicative of the lack of such variation in modern cultivars. We are therefore pessimistic about the prospect of utilizing existing allozymic differences for legal purposes.

In light of this situation, one might consider introducing specific molecular markers into given cvs. Cultivars, land races, and closely related species from Ecuador-Peru contain a wealth of allozymes not found in any modern cvs. Thus, in addition to the aforementioned *Est-1*^{1} and *Prx-4*^{7} found in North Temperate cvs., *Adh-1*^{1} , *Got-1*^{1} , *Prx-4*^{2} , and *Prx-7*^{1} are available in certain Andean cvs. These alleles would have greater appeal to the breeder than those requiring wider crosses with other species. A cultivar into which one of these alleles has been introduced would be distinguishable from all others solely on the basis of this one genetic character. An additional advantage of such allozymic differences is that they have never been observed to exert any morphological or physiological effect on the phenotype. Using this method, seed companies could adopt specific alleles to identify their products. Whether would-be patent seekers are willing to expend the effort to incorporate these rare alleles is another question, but the potential is there.

Valkova-Achkova, Z. *L. peruvianum,* a source of CMS. (submitted by C. Daskaloff]

Cytoplasmic-nuclear relations between *L. peruvianum* and other *species of the genus* have not been well studied because of the unilateral incompatibility between the self-compatible and self-incompatible species and the considerable reproductive isolation of the *peruvianum* complex. The non-crossability of *L. peruvianum* can be overcome by hybridization at the heteroploid level (diploid *peruvianum* and tetraploid mate) or by the use of inbred lines of *L. peruvianum.* By means of the first method we obtained hybrids and backcross generations between *L. peruvianum* (female parent) and *L. hirsutum* f. *typicum, L. hirsutum* f. *glabratum, L. minutum,* and *S. pennellii.* F_1 *L. peruvianum* (diploid) x *L. hirsutum* f. *glabratum* (tetraploid) was used as a bridge between *L. peruvianum* on the one hand and *L. pimpinellifolium* on the other. By means of the second method we obtained hybrids between *L. peruvianum* and *L. peruvianum* var. *humifusum* and *S. pennellii.* CMS (cytoplasmic male sterility) manifestations were observed only in the combinations *L. Peruvianum* x *L. hirsutum* f. *typicum* and *L. peruvianum* x *S. pennellii.* The flowers of the plants of BC_1-P_2 to BC_4-P_2 in the last two combinations grew smaller, the corolla was slightly curled, did not open completely, and often the style was hidden in some of its folds. The stamens were progressively reduced in BC_1 to BC_4. Even in BC_1 they contained little pollen, whose viability was severely lowered. CMS was manifested earlier and was more extreme in the *pennellii* hybrid (see table). In both combinations the ovules functioned normally. In all plants the changes in flower morphology and pollen viability were in one direction and no deviations or exceptions were observed.

Pollen sterility in F_1-BC_4-P_2 (in %)

Hybrid generations	L. peruvianum x L. hirsutum f. typicum			L. peruvianum x S. pennellii		
	min.	max.	mean	min.	max.	mean
F_1	43.52	89.16	61.55	6.20	99.90	40.74
BC_1	49.79	99.20	77.45	96.16	99.48	98.16
BC_2	87.69	99.80	93.51	95.78	100.00	97.95
BC_3	94.85	100.00	97.07	97.12	100.00	99.16
BC_4	95.80	100.00	97.66	97.00	100.00	99.22

PART II

STOCK LIST

STOCK DESIRED

Kerr, E. A. — High C cv. (A. F. Yeager's "High C" introduced in 1940's).

STOCKS AVAILABLE

Regional Plant Introduction Station — The world collection of tomato introductions for the Crops Research Division ARS, USDA is maintained: species, hybrids, named varieties as well as foreign introductions of L. esculentum and certain genetic marker stocks.

Tomato Genetics Stock Center
Department of Vegetable Crops
University of California
Davis, CA 95616

Gene stocks (607 items, TGC 28:21-32)

Gene stocks - modern & primitive cultivars, chromosomal stocks (507 items, TGC 29:40-47)

Species stocks (546 items, revision & expansion of list issued in TGC 27) - list follows

Revision of the species list first issued in TGC 27

The following list of 546 tomato species accessions has been prepared for the convenience of TGC members and other interested scientists. Collected by members of the Davis team and colleagues, these items have been propagated at Davis. Stocks of the outcrossed, polymorphic accessions are increased in a fashion to maintain the maximum possible genetic variation. Likewise, more liberal samples of these are distributed to provide correspondents the diversity they might need in searching for desired characters. Upon request, additional information can be furnished concerning these lines. A few accessions that are in short supply have been deleted and many new items acquired in the meanwhile have been added.

Species Stocks -- Revised List

Acc. No.	Site	Prov. or Dept.	Country
L. cheesmanii			
LA 166	Sta. Cruz	(All locations in the Galápagos Islands, Ecuador)	
LA 317	S. Bartolomé		
LA 421	Wreck Bay, Cristóbal		
LA 422	Cristóbal		
LA 426	S. Bartolomé		
LA 427	Jervis		
LA 428	Sta.Cruz N.		
LA 429	Sta.Cruz Crater		
LA 434	Sta.Cruz,Rambech Trail		
LA 436	Villamil, Isabela		
LA 437	Villamil, Isabela		
LA 438	Isabela Coast		
LA 480A	Cowley Bay, Isabela		
LA 483	Fernandina Crater		
LA 522	Fernandina slopes		
LA 524	Isabela, Pta.Essex		
LA 526	Abingdon, W.side		
LA 527	Bartolomé		
LA 528	Academy Bay, Sta.Cruz		
LA 529	Fernandina Crater		
LA 530	Fernandina Crater		
LA 531	Baltra		
LA 532	Duncan		
LA 746	Punta Essex, Isabela		
LA 747	Cape Trenton, Santiago		
LA 748	E. Trenton Island		
LA 749	Fernandina, N.side		
LA 927	Academy Bay, Sta.Cruz		
LA 928	Academy Bay, Sta.Cruz		
LA 929	Isabela, Pta. Flores		
LA 930	Santiago, Cabo Tortuga		
LA 932	Isabela, Tagus Cove		
LA 1035	Fernandina, low elevation		
LA 1036	Isabela, N. end		
LA 1037	Isabela, Alcedo		
LA 1039	Isabela, Cape Berkeley		
LA 1040	Cristóbal, Cal.Tortuga		
LA 1041	S. Cruz, El Cascajo		
LA 1042	Isabela S.Tomás, 6 km de VI		
LA 1043	Isabela S.Tomás, 10 km de VI		
LA 1044	Bartolomé		
LA 1136	Gardner, near Charles		
LA 1137	Jervis, N. side		
LA 1138	Isabela, E. of Cerro, Azul		
LA 1139	Isabela		
LA 1141	Santiago, N. Crater		

Acc. No.	Site	Prov. or Dept.	Country
L. cheesmanii (cont.)			
LA 1400	Isabela, Tagus Cove, N. of Pta. Tortuga	(All locations in the Galápagos Islands, Ecuador)	
LA 1401	Isabela, Tagus Cove, N. of Pta.Tortuga		
LA 1402	Fernandina, W. of Pta.Espinoza		
LA 1403	Fernandina, W. of Pta.Espinoza		
LA 1404	Fernandina, W. Flank Caldera		
LA 1405	Fernandina, NW. Rim Caldera		
LA 1406	Fernandina, SW. Rim Caldera		
LA 1407	Fernandina, NW. Bench Caldera		
LA 1408	Isabela, SW Volc., Cape Berkeley		
LA 1409	Isabela, Pta. Albermarle		
LA 1410	Isabela, Pta. Ecuador		
LA 1411	Santiago, N. James Bay		
LA 1412	San Crist., opp. I. Lobos		
LA 1414	Isabela, Cerro Azul		
LA 1427	Fernandina		
LA 1447	C. Darwin Sta.-Pta.Nunez, Sta.Cruz		
LA 1448	Pta. Ayora Pel Bay, Sta.Cruz		
LA 1449	C. Dar. Sta., Seismo Sta., Sta.Cruz		
LA 1450	Isabela, Ba. S. Pedro		
LA 1452	E. Slope Alcedo		
LA 1508	Corona del Diablo (near Floreana)		
L. chilense			
LA 130	Moquegua	Moquegua	Perú
LA 294	Tacna (og)	Tacna	Perú
LA 456	Clemesí	Moquegua	Perú
LA 458	Tacna	Tacna	Perú
LA 460	Palca	Tacna	Perú
LA 470	Taltal	Antofagasta	Chile
LA 1029	N. Moquegua	Moquegua	Perú
LA 1030	Tarata Rd.	Antofagasta	Chile
LA 1782	Quebrada de Acarí	Arequípa	Perú
LA 1931	Mina de Sta. Rosa	Arequípa	Perú
LA 1932	Minas de Acarí	Arequípa	Perú
LA 1938	Quebrada Salsipuedes, Rio Cháparra	Arequípa	Perú
LA 1958	Pampa de la Clemesí	Arequípa	Perú
LA 1959	Huaico Moquegua	Moquegua	Perú
LA 1960	Río Osmoré	Moquegua	Perú
LA 1961	Toquepala	Tacna	Perú
LA 1963	Río Caplina	Tacna	Perú
LA 1965	Causiri	Tacna	Perú
LA 1967	Pachía	Tacna	Perú
LA 1969	Estique Pampa	Tacna	Perú
LA 1970	Tarata	Tacna	Perú
LA 1971	Palquilla	Tacna	Perú

Acc. No.	Site	Prov. or Dept.	Country
L. chmielewskii			
LA 1028	Casinchihua	Apurimac	Perú
LA 1306	Tambo	Ayacucho	Perú
LA 1316	Ocros	Ayacucho	Perú
LA 1317	Hda. Pajonal	Ayacucho	Perú
LA 1318	Auquibamba	Apurimac	Perú
LA 1325	Puente Cunyac	Apurimac	Perú
LA 1327	Soracata	Apurimac	Perú
LA 1330	Hda. Franciscó	Apurimac	Perú
L. esculentum v. *cerasiforme*			
LA 292	Sta. Cruz	Galápagos	Ecuador
LA 1025	Wahiawa	Hawaii	USA
LA 1203	Ciudad Vieja		Guatemala
LA 1204	Quetzaltenango		Guatemala
LA 1205	Copan		Honduras
LA 1206	Copan		Honduras
LA 1207			Mexico
LA 1208	Sierra Nevada		Colombia
LA 1209			Colombia
LA 1226	Sucua	Morona-Santiago	Ecuador
LA 1227	Sucua		Ecuador
LA 1228	Macas, S.Juan de los Monos	Morona-Santiago	Ecuador
LA 1229	Macas Plaza	Morona-Santiago	Ecuador
LA 1230	Macas	Morona-Santiago	Ecuador
LA 1231	Tena	Pastaza	Ecuador
LA 1247	La Vega	Loja	Ecuador
LA 1268	Chaclacayo	Lima	Perú
LA 1286	S. Martin de Pangoa	Junín	Perú
LA 1289	S. Martin de Pangoa	Junín	
LA 1290	Mazamari	Junín	Perú
LA 1291	Satipo Granja	Junín	Perú
LA 1307	Hotel Oasis, San Francisco	Ayacucho	Perú
LA 1308	San Francisco	Ayacucho	Perú
LA 1310	Hda. Santa Rosa	Ayacucho	Perú
LA 1311	Santa Rosa Puebla	Ayacucho	Perú
LA 1312	Paisanato	Cuzco	Perú
LA 1314	Granja Pichari	Cuzco	Perú
LA 1320	Hda. Carmen	Apurimac	Perú
LA 1323	Pfacchayoc	Apurimac	Perú
LA 1324	Hda. Potrero	Apurimac	Perú
LA 1328	Rio Pachachaca	Apurimac	Perú
LA 1334	Pescaderos	Arequipa	Perú
LA 1338	Puyo	Pastaza	Ecuador
LA 1372	Sta. Eulalia	Lima	Perú
LA 1385	Quincemil	Cuzco	Perú
LA 1386	Balsas, Rio Marañon	Amazonas	Perú
LA 1387	Quincemil	Cuzco	Perú
LA 1388	San Ramon	Junín	Perú
LA 1420	Lago Agrio	Napo	Ecuador

Acc. No.	Site	Prov. or Dept.	Country
L. esculentum v. cerasiforme (cont.)			
LA 1421	Sta. Cecilia	Napo	Ecuador
LA 1423	INIAP-Station Domingo	Pichincha	Ecuador
LA 1425	Villa Hermosa	Cauca	Colombia
LA 1426	Cali	Cauca	Colombia
LA 1428	La Estancilla	Manabi	Ecuador
LA 1429	La Estancilla	Manabi	Ecuador
LA 1453	Kauai-Paipu	Hawaii	USA
LA 1454	?		Mexico
LA 1455	Gral Teran	Nuevo Leon	Mexico
LA 1456	Papantla	Vera Cruz	Mexico
LA 1458	Huachinango	Pueblo	Mexico
LA 1461	U. Philippines, Los Baños		Philippines
LA 1464	El Progr.-Yoro		Honduras
LA 1465	Taladro, Comayagua		Honduras
LA 1467	Cali	Cauca	Colombia
LA 1468	Cali Fté. Casa		Colombia
LA 1479	Sucua	Morona-Santiago	Ecuador
LA 1480	Sucua	Morona-Santiago	Ecuador
LA 1481	Sucua	Morona-Santiago	Ecuador
LA 1482	Ham. Segamat		Malaysia
LA 1483	Ham.-Trujillo		Saipan
LA 1509	Tawan		Borneo
LA 1511	Sete Lagoas		Brazil
LA 1512	Lago Llopango		San Salvador
LA 1540	Cali-Popayán	Cauca	Colombia
LA 1542	Turrialba		Costa Rica
LA 1543	Upper Parana		Brazil
LA 1545	Becán Ruins	Campeche	Mexico
LA 1546	Papantla	Vera Cruz	Mexico
LA 1548	Fundo Iliana, San Martin de Pangoa	Junín	Perú
LA 1549	Chontabamba, Oxapampa	Junín	Perú
LA 1569	Jalapa		Mexico
LA 1574	Naña	Lima	Perú
LA 1619	Pichanaki	Junín	Perú
LA 1620	Castro Alves	Bahia	Brazil
LA 1621	Rio Venados-Hidalgo		Mexico
LA 1622	Lusaka		Zambia
LA 1623	Muna	Yucatan	Mexico
LA 1632	Moche-S. Fernando	La Libertad	Perú
LA 1654	Tarapoto	San Martin	Perú
LA 1655	Tarapoto	San Martin	Perú
LA 1662	El Ejido		Venezuela
LA 1667	Cali	Cauca	Colombia
LA 1668	Acapulco		Mexico
LA 1669	Jahuay	Ica	Perú
LA 1673	Naña	Lima	Perú
LA 1709	Desvio Yojoa		Honduras
LA 1710	Cariare		Costa Rica
LA 1711	Zamorano		Honduras

Acc. No.	Site	Prov. or Dept.	Country
L. esculentum v. cerasiforme (cont.)			
LA 1712	Pejibaye		Costa Rica
LA 1713	CATIE, Turrialba		Costa Rica
LA 1909	Quillabamba	Cuzco	Perú
LA 1953	La Curva	Arequipa	Perú
LA 2076			Bolivia
LA 2077			Bolivia
LA 2078	Mostardas	Rio Grande de Sol	Brazil
LA 2081	Kihei, Maui	Hawaii	USA
LA 2082	Arenal Valley		Honduras
LA 2085	Kemptom Park		S. Africa
L. hirsutum			
LA 94	Canta-Yangas	Lima	Perú
LA 386	Cajamarca	Cajamarca	Perú
LA 387	Sta. Apolonia	Cajamarca	Perú
LA 399	Abra Porcullo	Piura	Perú
LA 1033	Hda. Taulis	Lambayeque	Perú
LA 1223	Alausí	Chimborazo	Ecuador
LA 1252	Loja	Loja	Ecuador
LA 1253	Puebla Nuevo-Loja	Loja	Ecuador
LA 1255	Pedistal	Loja	Ecuador
LA 1264	Bucay	Chimborazo	Ecuador
LA 1265	Rio Chimbo	Chimborazo	Ecuador
LA 1266	Pallatanga	Chimborazo	Ecuador
LA 1295	Surco	Lima	Perú
LA 1298	Yaso	Lima	Perú
LA 1347	Empalme Otusco	La Libertad	Perú
LA 1352	Rope	Cajamarca	Perú
LA 1353	Contumazá	Cajamarca	Perú
LA 1354	Contumazá-Cascas	Cajamarca	Perú
LA 1361	Pariacoto	Ancash	Perú
LA 1362	Chacchán	Ancash	Perú
LA 1363	Alta Fortaleza	Ancash	Perú
LA 1366	Cajacay	Ancash	Perú
LA 1391	Baqua-Olmos	Amazonas	Perú
LA 1392	Huaraz-Casma	Ancash	Perú
LA 1393	Huaraz-Casma	Ancash	Perú
LA 1557	E. of Huaral	Lima	Perú
LA 1559	Huamantanza	Lima	Perú
LA 1560	Matucana	Lima	Perú
LA 1624	Jipijapa	Manabi	Ecuádor
LA 1625	S. Jipijapa	Manabi	Ecuádor
LA 1648	5 km above Yaso	Lima	Perú
LA 1681	Mushka, Cañete	Lima	Perú
LA 1691	Yauyos, Rio Cañete, Cañete	Lima	Perú
LA 1695	Cacachuhuasan, Cañete	Lima	Perú
LA 1696	Cam. Huanchuy-Cacra, Cañete	Lima	Perú
LA 1721	Ticrapo Viejo	Huancavelica	Perú

	Acc. No.	Site	Prov. or Dept.	Country
L. hirsutum (cont.)				
	LA 1731	Rio San Juan, km 86	Huancavelica	Perú
	LA 1736	Pucutay	Piura	Perú
	LA 1737	Cashacoto	Piura	Perú
	LA 1738	Desfiladero	Piura	Perú
(PI 390658)	LA 1739	W. of Canchaque	Piura	Perú
(PI 390659)	LA 1740	W. of Huancabamba	Piura	Perú
(PI 390661)	LA 1741	Sondorillo	Piura	Perú
	LA 1753	Surco	Lima	Perú
	LA 1764	W. of Canta	Lima	Perú
	LA 1772	W. of Canta	Lima	Perú
	LA 1775	R. Casma, 71 km from Panam.	Ancash	Perú
	LA 1777	R. Casma, 97 km from Panam.	Ancash	Perú
	LA 1778	R. Casma, 92 km from Panam.	Ancash	Perú
	LA 1918	Llauta	Ayacucho	Perú
L. parviflorum				
	LA 247	Chavanillo Ochoa	Huánuco	Perú
	LA 1319	Abancay	Apurimac	Perú
	LA 1321	Curuhuasi	Apurimac	Perú
	LA 1322	Limatambo	Cuzco	Perú
	LA 1326	Soracata	Apurimac	Perú
	LA 1329	Yaca	Apurimac	Perú
	LA 1716	Huancabamba	Piura	Perú
	LA 2072	Huánuco	Huánuco	Perú
	LA 2073	Huánuco	Huánuco	Perú
	LA 2074	Huánuco	Huánuco	Perú
	LA 2075	Huánuco	Huánuco	Perú
L. peruvianum				
	LA 98	Chilca	Lima	Perú
	LA 103	Cajamarquilla	Lima	Perú
	LA 107	Hda. San Isidro	Lima	Perú
	LA 110	Cajacay	Ancash	Perú
	LA 111	Supe	Lima	Perú
	LA 364	Canta	Lima	Perú
	LA 370	Huampaní	Lima	Perú
	LA 371	Supe	Lima	Perú
	LA 372	Culebras	Ancash	Perú
	LA 374	Culebras	Ancash	Perú
	LA 378	Cascas	Cajamarca	Perú
	LA 385	San Juan	Cajamarca	Perú
	LA 389	Abra Gavilán	Cajamarca	Perú
	LA 392	Llallán	Cajamarca	Perú
	LA 441	Cerro Campana	La Libertad	Perú
	LA 444	Chincha	Ica	Perú
	LA 445	Chincha	Ica	Perú
	LA 446	Atiquipa	Arequipa	Perú
	LA 448	Chala	Arequipa	Perú

Acc. No.	Site	Prov. or Dept.	Country
L. peruvianum (cont.)			
LA 451	Arequipa	Arequipa	Perú
LA 452	Yura	Arequipa	Perú
LA 453	Yura	Arequipa	Perú
LA 454	Tambo	Arequipa	Perú
LA 455	Tambo	Arequipa	Perú
LA 462	Azapa	Arica	Chile
LA 464	Hda. Rosario	Arica	Chile
LA 465	Lluta	Arica	Chile
LA 752	Sisacaya	Lima	Perú
LA 1133	Huachipa	Lima	Perú
LA 1270	Pisiquillo	Lima	Perú
LA 1271	Horcon	Lima	Perú
LA 1274	Pacaibamba	Lima	Perú
LA 1278	Trapiche	Lima	Perú
LA 1281	Sisicaya	Lima	Perú
LA 1283	Santa Cruz de Laya	Lima	Perú
LA 1284	Espiritu Santo	Lima	Perú
LA 1292	San Mateo	Lima	Perú
LA 1293	Matucana	Lima	Perú
LA 1294	Surco	Lima	Perú
LA 1296	Tornamesa	Lima	Perú
LA 1300	Santa Rosa de Quives	Lima	Perú
LA 1304	Pámpano	Huancavelica	Perú
LA 1305	Ticrapo	Huancavelica	Perú
LA 1331	Nazca	Ica	Perú
LA 1333	Loma Camaná	Arequipa	Perú
LA 1336	Atico	Arequipa	Perú
LA 1337	Atiquipa	Arequipa	Perú
LA 1339	Capillucas	Lima	Perú
LA 1346	Casmiche	La Libertad	Perú
LA 1350	Chauna	La Libertad	Perú
LA 1351	Rope	Cajamarca	Perú
LA 1358	Yaután	Ancash	Perú
LA 1360	Pariacoto	Ancash	Perú
LA 1364	Alta Fortaleza	Ancash	Perú
LA 1365	Caranquilloc	Ancash	Perú
LA 1368	San Jose de Palla	Lima	Perú
LA 1369	San Geronimo	Lima	Perú
LA 1373	Asia	Lima	Perú
LA 1377	Nayán	Lima	Perú
LA 1379	Cajyul	Lima	Perú
LA 1473	Callahuama, St. Eu.	Lima	Perú
LA 1475	Los Anitos, Barranca	Lima	Perú
LA 1513	Atiquipa	Arequipa	Perú
LA 1517	13 km Sta. Rosa	Lima	Perú
LA 1537	prob. Peru	Lima	Perú
LA 1551	Rimac Valley, 71 km from Lima	Lima	Perú
LA 1552	Rimac Valley, 93 km from Lima	Lima	Perú
LA 1554	Río Huaura, 85 km from Huaral	Lima	Perú

Acc. No.	Site	Prov. or Dept.	Country
L. peruvianum (cont.)			
LA 1556	Rimac Valley, Hda. Higuereto, R. Surco	Lima	Perú
LA 1609	Asia	Lima	Perú
LA 1616	La Molina	Lima	Perú
LA 1646	3 km above Yaso	Lima	Perú
LA 1647	Huadquina, Topara	Lima	Perú
LA 1653	Uchumayo-Arequipa	Arequipa	Perú
LA 1675	Toparilla Canyon	Lima	Perú
LA 1677	Topara-Huadquina	Lima	Perú
LA 1692	Putinza, R. Cañete	Lima	Perú
LA 1694	Cacahuhuasan Cañete	Lima	Perú
LA 1722	Ticrapo Viejo	Huancavelica	Perú
LA 1744	Putinza, R. Cañete	Lima	Perú
LA 1910	Tambillo, Río Ica	Huancavelica	Perú
LA 1929	La Yapana	Ingenio	Perú
LA 1935	Lomas de Atiquipa	Arequipa	Perú
LA 1937	Quebr. Torrecillas, R. Cháparra	Arequipa	Perú
LA 1944	R. Atico, 61 km from Panam.	Arequipa	Perú
LA 1945	Caravelí	Arequipa	Perú
LA 1949	Los Calavaritos	Arequipa	Perú
LA 1954	Mollendo	Arequipa	Perú
LA 1955	Matarani	Arequipa	Perú
LA 1975	Desv. S.Domingo, R. Rimac	Lima	Perú
LA 1981	Vocatoma, R. Santa	Ancash	Perú
LA 2067	Lomas de Atacongo	Lima	Perú
L. pimpinellifolium			
LA 100	La Cantuta	Lima	Perú
LA 114	Pacasmayo	La Libertad	Perú
LA 121	Trujillo	La Libertad	Perú
LA 122	Poroto	La Libertad	Perú
LA 369	La Cantuta	Lima	Perú
LA 373	Culebras	Ancash	Perú
LA 375	Culebras	Ancash	Perú
LA 376	Chiclín	La Libertad	Perú
LA 381	Pongo	La Libertad	Perú
LA 384	Chilete	Cajamarca	Perú
LA 391	Magdalena	Cajamarca	Perú
LA 397	Hda. Tumán		Perú
LA 398	Hda. Carrizal	Piura	Perú
LA 411	Pichilingue	Los Ríos	Ecuador
LA 412	Pichilingue	Los Ríos	Ecuador
LA 413	Cerecita	Guayas	Ecuador
LA 417	Puná	Guayas	Ecuador
LA 418	Daule	Guayas	Ecuador
LA 420	El Empalme	Guayas	Ecuador
LA 442	Sechín	Ancash	Perú
LA 443	Pichilingue	Los Ríos	Ecuador

Acc. No.	Site	Prov. or Dept.	Country
L. pimpinellifolium (cont.)			
LA 480	Hda. Sta. Inez	Lima	Perú
LA 722	Trujillo	La Libertad	Perú
LA 753	Lurín	Lima	Perú
LA 1236	Santo Domingo	Tinelandia	Ecuador
LA 1237	Atacames	Esmeraldas	Ecuador
LA 1242	Los Sapos	Guayas	Ecuador
LA 1243	Hda. Carmela	Guayas	Ecuador
LA 1245	Santa Rosa	El Oro	Ecuador
LA 1246	La Toma	Loja	Ecuador
LA 1248	Hda. Monterrey	Loja	Ecuador
LA 1256	Naranjal	Guayas	Ecuador
LA 1257	Las Mercedes	Guayas	Ecuador
LA 1258	Voluntario de Dios	Guayas	Ecuador
LA 1259	Catarama	Los Ríos	Ecuador
LA 1260	Puebla, Viejo	Los Ríos	Ecuador
LA 1261	Babahoyo	Los Ríos	Ecuador
LA 1262	Milagro jct on rt 33	Los Ríos	Ecuador
LA 1263	Barranco Chico	Guayas	Ecuador
LA 1269	Pisiquillo	Lima	Perú
LA 1279	Cienguilla	Lima	Perú
LA 1280	Chantay	Lima	Perú
LA 1301	Hda. San Ignacio	Ica	Perú
LA 1332	Nazca	Ica	Perú
LA 1335	Pescaderos	Arequipa	Perú
LA 1341	Huampaní	Lima	Perú
LA 1342	Casma	Ancash	Perú
LA 1343	Puente, Chao	La Libertad	Perú
LA 1344	Laredo	La Libertad	Perú
LA 1345	Samne	La Libertad	Perú
LA 1348	7 mi. E., Pacasmayo	La Libertad	Perú
LA 1349	Cuculí	Lambayeque	Perú
LA 1355	Nepeña	Ancash	Perú
LA 1357	Jimbe	Ancash	Perú
LA 1359	La Crau	Ancash	Perú
LA 1370	San Jose de Palla	Lima	Perú
LA 1371	Santa Eulalia	Lima	Perú
LA 1374	Ingenio	Ica	Perú
LA 1375	San Vicente de Cañete	Lima	Perú
LA 1380	Chanchape		Perú
LA 1381	Ñaupe	Tambayeque	Perú
LA 1382	Chachapoyas-Balsas	Amazonas	Perú
LA 1383	Chachapoyas-Bagua	Amazonas	Perú
LA 1384	Quebrada Parca (Chilca)	Lima	Perú
LA 1416	Las Delicias	Pichincha	Ecuador
LA 1466	Chongoyape	Lambayeque	Perú
LA 1469	El Pilar, Olmos	Lambayeque	Perú
LA 1470	Motupe-Olmos	Lambayeque	Perú
LA 1471	Motupe-Jayanca	Lambayeque	Perú
LA 1472	Qbrda. Topará	Lima	Perú
LA 1478	Sto. Tomé	Piura	Perú
LA 1514	60 km Huaura-Chur.	Lima	Perú

L. pimpinellifolium (cont.)

Acc. No.	Site	Prov. or Dept.	Country
LA 1519	Vitarte	Lima	Perú
LA 1520	?	Lima	Perú
LA 1521	El Piñón, Asia	Lima	Perú
LA 1561	Huaura: Sta. Eusebia	Lima	Perú
LA 1571	S. Juan de Palla	Lima	Perú
LA 1572	Huampani	Lima	Perú
LA 1573	Naña	Lima	Perú
LA 1575	Huaycán	Lima	Perú
LA 1576	Manchay Alta	Lima	Perú
LA 1577	Cartavio	La Libertad	Perú
LA 1578	Jequetepeque	La Libertad	Perú
LA 1579	Col. Pto. Cuarto #1	Lambayeque	Perú
LA 1580	Col. Pto. Cuarto #2	Lambayeque	Perú
LA 1581	Punto Cuarto	Lambayeque	Perú
LA 1582	Motupe	Lambayeque	Perú
LA 1583	Tierra de la Vieja	Lambayeque	Perú
LA 1584	Jayanca-La Viña	Lambayeque	Perú
LA 1585	Cuculí	Lambayeque	Perú
LA 1586	Zaña-San Nicolás	La Libertad	Perú
LA 1587	San Pedro de Lloc	La Libertad	Perú
LA 1588	Loredo-Barraza	La Libertad	Perú
LA 1589	Virú-Calunga	La Libertad	Perú
LA 1590	Virú-Tomaval	La Libertad	Perú
LA 1591	Ascope	La Libertad	Perú
LA 1592	Moche	La Libertad	Perú
LA 1593	Puente Chao	La Libertad	Perú
LA 1594	Cerro Sechín	Ancash	Perú
LA 1595	Nepeña-Samanco	Ancash	Perú
LA 1596	Santa-La Rinconada	Ancash	Perú
LA 1597	Río Casma	Ancash	Perú
LA 1598	Culebras-La Victoria	Ancash	Perú
LA 1599	Huarmey	Ancash	Perú
LA 1600	Las Zorras	Ancash	Perú
LA 1601	Río Pativilca-La Providencia	Ancash	Perú
LA 1602	Río Chillon-Punchauca	Lima	Perú
LA 1603	Quilca	Lima	Perú
LA 1604	Horcón	Lima	Perú
LA 1605	Cañete-San Antonio	Lima	Perú
LA 1606	Tambo de Mora	Ica	Perú
LA 1607	Cañete-La Victoria	Lima	Perú
LA 1608	Cañete-San Luis	Lima	Perú
LA 1610	Asia-El Piñon	Lima	Perú
LA 1611	Río Mala	Lima	Perú
LA 1612	Río Chilca	Lima	Perú
LA 1613	Río Huaura-Santa Eusebia	Lima	Perú
LA 1614	Río Huaura-Pampa Chumbes	Lima	Perú
LA 1615	Piura-Simbalá	Piura	Perú
LA 1617	Tumbes South	Tumbes	Perú
LA 1618	Tumbes North	Tumbes	Perú
LA 1628	Huanchaco-Libertad	La Libertad	Perú

Acc. No.	Site	Prov. or Dept.	Country
L. pimpinellifolium (cont.)			
LA 1629	Miraflores-Costa Verde	Lima	Perú
LA 1630	Chincha-Fundo La Palma	Ica	Perú
LA 1631	Moche S. Fernando	La Libertad	Perú
LA 1633	Chincha: coop. Huayna Capac	Ica	Perú
LA 1634	El Ingenio: Fundo Bogotalla	Ica	Perú
LA 1635	El Ingenio: Fundo Bogotalla #2	Ica	Perú
LA 1636	Chincha: Larán	Ica	Perú
LA 1637	Chincha: La Calera	Ica	Perú
LA 1638	Huachipa: Fundo El Portillo	Lima	Perú
LA 1645	Miraflores-Armendariz	Lima	Perú
LA 1651	La Molina	Lima	Perú
LA 1652	Girasol-Cienguilla	Lima	Perú
LA 1659	4 km E. of Pariacoto	Ancash	Perú
LA 1660	Yaután-Pariacoto	Ancash	Perú
LA 1661	Esquina de Asia	Lima	Perú
LA 1670	Rio Sama	Tacna	Perú
LA 1676	Fundo Huadguina-Topará	Ica	Perú
LA 1678	San Juan Lucumo de Topará	Ica	Perú
LA 1679	Tambo de Mora	Ica	Perú
LA 1680	Cañete-La Encañada	Lima	Perú
LA 1682	Cañete-Montalbán	Lima	Perú
LA 1683	R. Chira-Miramár	Piura	Perú
LA 1684	Chulucanas	Piura	Perú
LA 1685	Marcavelica	Piura	Perú
LA 1686	Valle Hermoso #1	Piura	Perú
LA 1687	Valle Hermoso #2	Piura	Perú
LA 1688	Pedregal	Piura	Perú
LA 1689	Piura-Castilla #1	Piura	Perú
LA 1690	Piura-Castilla #2	Piura	Perú
LA 1697	Hda. Santa Anita, R. Huaura	Lima	Perú
LA 1719	E. of Arenillas	El Oro	Ecuador
LA 1742	Olmos-Marquina	Lambayeque	Perú
LA 1781	Bahia de Caraquéz	Manabí	Ecuador
LA 1921	Majareña	Ica	Perú
LA 1923	Cabildo	Ica	Perú
LA 1924	Piedras Gordas	Ica	Perú
LA 1925	Pangaraví	Ica	Perú
LA 1933	Jaquí	Arequipa	Perú
LA 1936	Huancalpa, R. Cháparra	Arequipa	Perú
LA 1950	Pescadores, R. Caravelí	Arequipa	Perú
LA 1987	Virú-Fundo Lius Enrique	La Libertad	Perú
LA 1992	Pishicato, R. Lurin	Lima	Perú
LA 1993	Chicama Valley (?)	Lima	Perú
LA 2066	Tembladera	Ancash	Perú

Acc. No.	Site	Prov. or Dept.	Country
Solanum lycopersicoides			
LA 1990	Palca	Tacna	Perú
LA 1991	Causiri	Tacna	Perú
S. pennellii			
LA 716	Atico	Arequipa	Perú
LA 750	Ica-Nazca	Ica	Perú
LA 751	Sisicaya	Lima	Perú
LA 1272	Pisaquera arriba	Lima	Perú
LA 1273	Cayán	Lima	Perú
LA 1275	Quilca road jct.	Lima	Perú
LA 1277	Trapiche	Lima	Perú
LA 1282	Sisacaya	Lima	Perú
LA 1297	Pucará	Lima	Perú
LA 1299	Santa Rosa de Quives	Lima	Perú
LA 1302	Quita Sol	Ica	Perú
LA 1303	Pampano	Huancavelica	Perú
LA 1340	Capillucas	Lima	Perú
LA 1356	Moro	Lima	Perú
LA 1367	Santa Eulalia	Lima	Perú
LA 1376	Sayán	Lima	Perú
LA 1515	Huaura-Churín	Lima	Perú
LA 1522	Huaura-Sayán	Lima	Perú
LA 1649	Molina (Ingenio)	Ica	Perú
LA 1656	Marca-Chincha	Ica	Perú
LA 1657	Buena Vista-Yaután	Ancash	Perú
LA 1674	Toparilla Canyon	Lima	Perú
LA 1693	Queb. Machuranga (Zuñiga)	Lima	Perú
LA 1724	La Quinga (R. Pisco)	Ica	Perú
LA 1732	R. San Juna, km 44	Huancavelica	Perú
LA 1733	R. Cañete, km 75	Lima	Perú
LA 1734	R. Cañete, km 85	Lima	Perú
LA 1735	R. Cañete, km 87	Lima	Perú
LA 1809	El Horador	Piura	Perú
LA 1911	Locarí (R. Santa Cruz)	Ica	Perú
LA 1912	Cerro Locarí (R. Santa Cruz)	Ica	Perú
LA 1920	Chachiruma (R. Grande)	Ayacucho	Perú
LA 1926	Agua Perdida (R. Ingenio)	Ica	Perú
LA 1940	Rio Atico, km 26	Arequipa	Perú
LA 1941	Rio Atico, km 41	Arequipa	Perú
LA 1942	Rio Atico, km 54	Arequipa	Perú
LA 1943	Rio Atico, km 61	Arequipa	Perú
LA 1946	Caravelí	Arequipa	Perú
S. rickii			
LA 1974	Chuquicamata	Antafagasta	Chile

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PART IV

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PART V

FINANCIAL STATEMENT

January 1, 1979 - December 31, 1979

		Total
Balance from 1978		$1,213.44
Receipts		
Assessments	$ 816.20	
Sale of back issues	394.50	
NSF Grant funds for publishing stock lists	497.87	
Payment for air postage	17.22	$1,725.79
		$2,939.23
Expenditures		
Printing Report #29	$1,180.67	
Postage	271.97	
Envelopes	21.79	
Library search service	64.07	
Xerox	1.35	
Paper fasteners	8.30	$1,548.15
Balance	Balance	$1,391.08

MEMBERSHIP STATUS

(to December 31, 1979)

Assessments paid for	1979	118
	1980	138
	1981	43
	1982	16
	1983	10
	1984	7
	1985	3
	1986	1
	1987	2
	1988	1
	1989	1
	1990	1
	Total	341

APPENDIX

Supplement to COLLECTIONS OF GREEN-FRUITED *Lycopersicon* SPECIES AND *Solanum pennellii* FOUND IN THE WATERSHEDS OF PERU

M. Holle, C. M. Rick, and D. G. Hunt

Table. Seed accessions of green-fruited *Lycopersicon* species and *Solanum pennellii* collected in the watersheds and lomas of Peru (Jan.-Feb. 1979).

Species Watershed & site	Altitude (m)	Collector(s)	Date coll.	Seed	No. of plants	Identification number
L. chilense						
RIO ACARÍ						
Quebrada Calapampa		C.M.Rick, L.Ugarte	Ja79	+		LA1930
Minas de Acarí		"	"	+		LA1932
Santa Rosa		"	"	+		LA1931
RIO YAUCA						
Tani		J.Fobes, M.Holle	"	-	Several	LA1934
RIO CHÁPARRA						
Quebrada Salsipuedes		C.M.Rick, J.Fobes M.Holle	"	+	Many	LA1938
RIO ATICO						
Quebrada Angostura		"	"	-	Several	LA1939
RIO MOQUEGUA						
Pampa de Clemesí		C.M.Rick, J.Fobes	"	+		LA1958
Huaico Moquegua		"	"	+		LA1959
Río Osmore 24 km E. of Moquegua		"	"	+		LA1960
Toquepala		"	"	+		LA1961
RIO SAMA						
Estique pampa		"	"	+		LA1969
Tarata		"	"	+		LA1970
Palquilla		"	"	+		LA1971
Río Sama 5 km S. of Sama		"	"	+		LA1972
RIO CAPLINA (TACNA)						
Huaico Tacna		"	"	+		LA1962
Río Caplina 13 km W. of Tacna		"	"	+		LA1963
Causiri		"	"	+		LA1965
Pachía		"	"	+		LA1967
Cauce Seco		"	"	+		LA1968
L. hirsutum						
RIO MOCHE						
Casmiche		C.M.Rick, J.Fobes	Fb79	+	?	LA1986
RIO FORTALEZA						
Colca		"	"	+		LA1979
Desvío Huambo		"	"	+		LA1980
RIO PALPA						
Llauta		C.M.Rick, L.Ugarte	Ja79	+		LA1918
RIO INGENIO						

Table (cont.)

Species Watershed & site	Altitude (m)	Collector(s)	Date coll.	Seed	No. of plants	Identification number
L. peruvianum						
RIO MOCHE						
Casmiche		C.M.Rick, J.Fobes	Fb1979	+	?	LA1985
Otuzco		"	"	+	?	LA1984
RIO SANTA						
Vocatoma		C.M.Rick, J.Fobes	Fb1979	+	?	LA1981
Huallanca		"	"	+	?	LA1982
Km 120 (R. Mauta)		"	"	+	?	LA1983
RIO FORTALEZA						
Colca		"	"	+	?	LA1979
RIO RIMAC						
Desvío Santo Domingo		"	Ja1979	+	?	LA1975
RIO LURÍN						
Orocucoto		"	Fb1979	+	?	LA1977
RIO ICA						
Tambillo		C.M.Rick, L.Ugarte	Ja1979	+		LA1910
QUEBRADA SANTA CRUZ						
Tinquiyog		J.Fobes, M.Holle	"	+	few	LA1913
RIO PALPA						
Platanal		C.M.Rick, L.Ugarte	"	-		LA1914
Cullanco		"	"	-		LA1915
Mallagto		"	"	-		LA1916
Llauta		"	"	+		LA1917
RIO GRANDE						
Gramadal Grande		J.Fobes, M.Holle	"	-		LA1922
RIO INGENIO (Quebrada Agua Perdida)						
La Yapana		J.Fobes, M.Holle	"	+ ?	few	LA1929
LOMAS DE ATIQUIPA	300	C.M.Rick, J.Fobes M.Holle	"	+	sev'l	LA1935
RIO CHAPARRA						
Quebrada Torrecillas		"	"	+	sev'l	LA1937
RIO ATICO						
Km 61		"	"	+	sev'l	LA1944
Puerto Atico	10	"	"	+	many	LA1947
Atico	10	"	"	-	many	LA1948
RIO CARAVELÍ						
Caravelí	20	"	"	+	sev'l	LA1945
Las Calavaritas	20	"	"	+	sev'l	LA1949
RIO OCOÑA						
Ocoña	20	"	"	+	sev'l	LA1951

Table (cont.)

Species Watershed & site	Altitude (m)	Collector(s)	Date coll.	Seed	No. of plants	Identification number
L. peruvianum (cont.)						
LOMAS DE CAMANÁ	800	C.M.Rick, J.Fobes M.Holle	Ja1979	+	many	LA1952
RIO VITOR - (AREQUIPA)						
Yura		C.M.Rick, J.Fobes	Ja1979	+	?	LA1973
LOMAS DE MOLLENDO (RÍO TAMBO)						
Mollendo	100	C.M.Rick, J.Fobes M.Holle	Ja1979	+	sev'l	LA1954
Matarani	100	"	"	+	many	LA1955
Boca de Guerrero	800	"	"	-	many	LA1956
El Fiscal	400	C.M.Rick, J.Fobes	"	-	?	LA1957
Solanum pennellii						
RIO SANTA CRUZ (Dept. ICA)						
Locarí		J.Fobes, M.Holle	Ja1979	+	few ?	LA1911
Co. Locarí		"	"	-	few ?	LA1912
RIO GRANDE						
Cachiruma		"	"	+	few ?	LA1920
RIO INGENIO (Quebrada Agua Perdida)						
Agua Perdida		"	"	+	one	LA1926
RIO ATICO						
Río Atico (Dept. Arequipa)		C.M.Rick, J.Fobes, M.Holle	"	+	sev'l	LA1940
Pan de Azúcar		"	"	+	many	LA1941
km 54 from Panamericana Sur		"	"	-	many	LA1942
km 61 " " "		"	"	+	many	LA1943
RIO CARAVELÍ						
Caravelí		"	"	+	few	LA1946

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REPORT

of the

TOMATO GENETICS COOPERATIVE

Number 30 May, 1980
Department of Vegetable Crops
University of California
Davis, California 95616

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Cover design from
mature leaf of *L. cheesmanii* f. *minor*
source of *Pts* (see p. 32)

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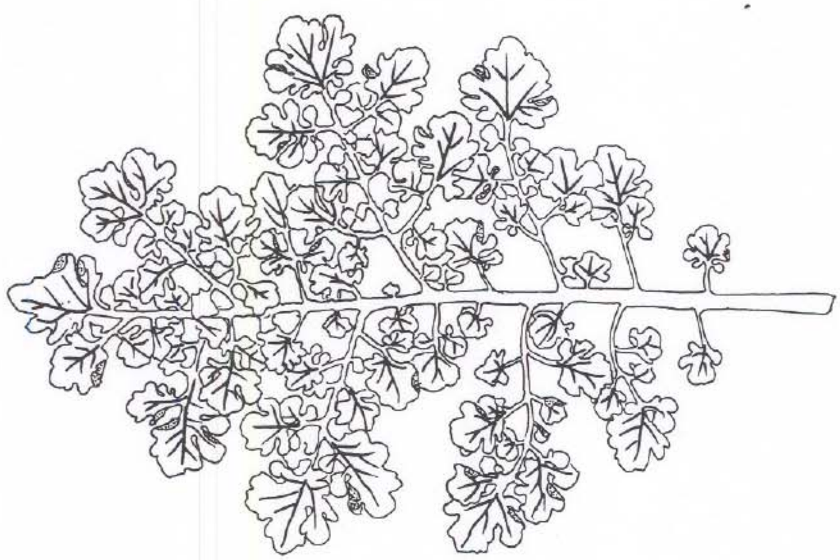

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