Leboeuf

ONTARIO TOMATO RESEARCH

AND

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Abstracts of 1993 Research Projects

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PROCESSING TOMATO BREEDING - EARLY GENERATION LINES - 1993

V. Poysa, HRS

In 1993 the top early generation breeding lines were derived from crosses combining Ontario, Ohio, and California material. The top F-4 lines, obtained from 90.007, 90.025, and 90.073, each have at least one parent developed in each region in their genetic background. The best F-5 lines, selections from cross 87.439, have Ohio, Heinz, and Nabisco lines in their parentage.

The performance of the top lines, relative to controls, is given in the following tables.

TOP F4 PROCESSING LINES, 1993

PEDIGREE	MAT	FDIS	CONC	QRAT	YLD	FRSZ
90.007-0-1-1	7.5	3.5	6.5	6.5	6.0	40.0
OH8550	9.0	3.5	6.0	4.5	6.5	40.0
90.025-0-3-2	4.0	7.0	4.0	5.0	6.0	52.5
HY9230	9.0	3.5	5.5	5.0	3.0	45.0
90.073-0-3-1	3.0	6.0	4.0	5.0	6.0	45.0
90.073-0-2-1	2.5	8.0	3.5	4.5	5.5	60.0
90.073-0-2-2	3.0	7.5	4.0	4.5	5.5	50.0
90.025-0-3-1	4.0	5.0	4.0	4.5	5.0	47.5
90.061-0-2-1	3.5	5.0	3.5	4.5	5.5	52.5
90.073-0-3-2	3.5	5.5	4.0	4.5	5.5	50.0

TOP F5 PROCESSING LINES

PEDIGREE	MAT	FDIS	CONC	QRAT	YLD	FRSZ
HY9478	6.0	4.5	5.5	6.5	7.0	45.0
87.439-3-2-1	5.0	5.5	5.5	5.5	7.0	60.0
87.439-3-2-3	7.0	3.0	5.5	6.0	7.0	47.5
87.439-3-2-4	8.0	2.5	5.5	6.0	6.0	52.5
87.439-3-2-2	7.0	3.5	5.5	4.5	6.0	47.5
CHATHAM	8.5	2.5	6.0	5.5	4.5	52.5
87.439-3-2-5	3.5	6.0	5.0	5.5	6.5	50.0
CC329	4.5	4.5	4.0	6.5	6.5	80.0
87.436-2-1-1	4.0	5.5	5.5	6.0	4.5	55.0
87.439-1-2-1	4.5	4.5	4.5	6.0	5.0	52.5

PROCESSING TOMATOES - ADVANCED LINES - 1993

V. Poysa, HRS

In 1993 we evaluated over 100 F-7 to F-9 lines in three 3-replicate trials, the Preliminary, Advanced, and Screening trials. Plots were evaluated on a 1-9 scale for earliness, fruit size, fruit yield potential, foliar disease resistance, concentration of set, and fruit quality (firmness, colour, internal structure). On a weighted basis, eight lines in the Preliminary Trial and two each in the Advanced and Screening Trials were superior to all the controls.

The performance of the lines in the three trials is given in the following tables.

TOP LINES, PRELIM TRIAL, 1993

PEDIGREE	MAT	FDIS	CONC	QRAT	YLD	FRSZ
87.050-1-1-2-4-1-3	7.5	4.5	5.0	5.5	6.0	42.5
87.050-1-1-2-4-1-1	7.5	4.5	6.0	5.0	5.5	47.5
87.037-1-4-6-3-1-6	6.5	4.0	5.0	6.0	6.0	45.0
87.050-1-1-7-2-1-1	9.0	3.5	5.5	5.5	5.0	40.0
87.050-1-1-2-4-1-2	7.5	3.5	6.0	5.0	5.5	37.5
87.038-1-4-2-1-2-2	6.0	5.5	4.5	6.5	5.5	42.5
87.050-1-1-7-2-1-2	7.5	3.5	5.5	6.0	5.0	42.5
87.050-1-1-7-2-1-8	9.0	3.0	6.5	4.5	5.0	37.5
HY9478	6.5	4.5	3.5	5.5	6.5	50.0
87.036-1-1-3-1-1-2	3.0	7.0	3.0	4.5	6.5	47.5

TOP LINES, ADVANCED TRIAL, 1993

PEDIGREE	MAT	FDIS	CONC	QRAT	YLD	FRSZ
84.193-5-1-5-1-1-3-0	7.0	5.0	5.3	5.7	7.0	45.0
84.184-6-5-4-2-2-2-0	7.0	5.3	4.3	6.7	6.3	46.7
CC7122	6.7	6.7	4.7	4.0	7.0	46.7
84.204-4-5-3-5-1-3-0	3.7	6.3	4.3	7.3	6.0	50.0
84.193-5-1-5-1-1-1-0	5.0	5.7	4.3	5.7	6.7	45.0
84.411-2-4-2-1-0-0	6.0	4.3	6.3	5.3	5.3	36.7
84.180-4-1-2-1-0-0	4.3	4.7	5.3	6.3	5.7	46.7
84.193-5-1-5-1-1-4-0	5.0	4.3	4.0	6.3	6.0	46.7
84.181-3-3-2-1-1-1-0	6.0	4.0	3.7	6.3	6.0	46.7
HY9478	7.7	3.0	4.7	5.0	5.3	45.0

TOP LINES, SCREENING TEST, 1993

PEDIGREE	MAT	FDIS	CONC	QRAT	YLD	FRSZ
RCAT9310=84-117BAA	7.0	4.0	6.3	6.7	6.0	50.0
84-193-5-1-5-1-1-3	6.0	5.0	5.3	5.7	6.0	41.7
CC7107	4.0	7.3	3.3	6.3	7.0	45.0
90-021-0-2	8.3	2.3	6.3	6.0	4.0	38.3
RCAT938=84-177DFBAA	5.7	4.0	4.7	6.0	6.0	48.3
86-104-1-1-1-4-0	5.3	4.7	4.7	5.7	5.7	43.3
86-104AAADA	6.0	3.3	3.7	6.3	6.3	45.0
89-5517AAA	4.7	4.7	4.3	6.3	6.3	46.7
87-050-1-1-7-2-1	8.0	2.7	5.7	5.3	4.7	40.0
CC390	4.3	5.3	3.0	6.3	6.0	50.0

DISEASE RESISTANCE BREEDING - SEPTORIA - 1993

V. Poysa, HRS

In 1993 we evaluated 170 preselected F-1 to F-8 tomato lines following controlled seedling inoculation with the fungus which causes Septorza leaf spot. Approximately 50 of these lines manifested levels of resistance which would protect the crop in the field without fungicide sprays. While none of the breeding lines have the extremely high levels of resistance found in some of the L. ***peruvianum*** and ***L. hirsutum*** lines, several experimental lines have resistance superior to the L. ***pimpinellifolium*** line, PI422397, combined with respectable fruit size, yield, and quality. Plants exhibiting high levels of resistance were transplanted to the field, for subsequent selection for earliness, fruit size and quality, fruit yield potential, and concentration of fruit set. One particularly promising F-4 line, 88.110, derived from a complex cross involving several sources of resistance, including PI422397, had very good resistance/tolerance to Septoria in the field and greenhouse along with determinate growth habit and good fruit size and yield potential.

PROCESSING TOMATOES - ADVANCED LINES DERIVED FROM WILD SPECIES

V. Poysa, HRS

In 1993 we evaluated 145 lines derived from L. *pennellii,* L. *cheesmanii, L. chmielewskii,* and *L. hirsutum* in four 2-replicate trials. Plots were evaluated on a 1-9 scale for earliness, foliar disease resistance, concentration of set, fruit quality (firmness, colour, internal structure), and fruit yield potential, as well as fruit size. These lines have been subject to several cycles of selection and backcrossing for high yields, concentrated fruit set, and large fruit size. Several lines from each related species showed some level of transgressive segregation for improved yield potential in early maturing lines with good fruit size.

The performance of the top experimental lines and controls in the four trials is given in the following tables.

TOP PROCESSING LINES FROM PENNELLII

PEDIGREE	MAT	FDIS	CONC	QRAT	YLD	FRSZ
87.164-1-3-1-4-2	7.0	6.0	4.5	5.5	7.0	40.0
87.164-1-3-1-4-3	6.5	5.0	4.5	6.0	7.5	40.0
87.164-1-3-1-1-3	9.0	3.5	6.5	5.5	5.0	37.5
CC7107	5.0	5.5	3.0	7.0	7.5	42.5
87.164-1-3-1-3-2	7.5	3.5	5.0	5.5	5.5	40.0
87.164-1-3-1-1-4	7.5	3.5	5.5	6.0	4.0	40.0
CC329	8.0	3.0	4.5	5.0	5.5	37.5
87.164-1-3-1-4-1	7.0	3.0	4.5	5.5	5.5	37.5
87.160-1-1-2-1-4	4.0	6.0	2.5	6.0	6.5	42.5
87.160-1-1-2-1-2	3.0	6.5	3.5	6.5	5.5	57.5

TOP PROCESSING LINES FROM HIRSUTUM

PEDIGREE	MAT	FDIS	CONC	QRAT	YLD	FRSZ
90.196-1-5	6.5	5.5	4.0	6.5	6.5	45.0
CC7122	6.5	5.5	3.5	6.0	7.0	47.5
90.194-1-3	6.0	5.0	4.0	6.0	7.0	45.0
90.194-1-1	5.5	4.5	5.0	6.0	6.5	42.5
87.112-2-2-1-2-2	6.5	3.5	4.5	5.0	7.5	50.0
86.399-2-3-4-1-2	5.0	6.5	3.5	6.0	6.5	42.5
90.196-1-1	6.0	3.5	3.5	6.5	6.5	47.5
HY9230	8.5	3.0	5.5	5.0	4.5	45.0
86.399-2-3-3-1-2	5.5	5.0	3.0	6.0	6.5	47.5
87.112-2-2-1-2-1	6.0	4.5	4.0	4.5	7.0	45.0

TOP PROCESSING LINES FROM CHEESMANII

PEDIGREE	MAT	FDIS	CONC	QRAT	YLD	FRSZ
188.027-11-1-3-1	6.0	6.0	5.0	7.0	6.0	37.5
188.027-11-1-3-4	6.5	6.0	4.5	6.0	6.5	37.5
CC7107	4.0	6.5	3.5	7.0	7.5	42.5
188.027-11-1-3-3	7.5	5.5	4.5	6.0	6.5	32.5
HY9230	8.5	2.5	6.5	5.0	5.5	45.0
186.165-1-1-4-1-1-1	4.5	5.5	4.5	7.0	6.0	42.5
OH8550	8.5	3.0	6.5	4.5	5.5	40.0
186.165-1-1-3-3-1-1	4.5	3.0	5.5	7.0	7.0	45.0
CC164	8.0	3.0	6.0	5.5	4.5	37.5
188.330-2-1-3	6.5	4.5	6.0	6.0	4.5	40.0
186.165-1-2-2-2-1	5.5	6.0	4.0	6.0	5.5	37.5

TOP PROCESSING LINES FROM CHMIELEWSKII

PEDIGREE	MAT	PDIS	CONC	QRAT	YLD	FRSZ
87.303-1-1-1-2	6.5	4.5	4.5	7.0	6.5	42.5
87.303-1-1-1-3	5.5	6.0	5.5	7.0	5.5	40.0
88.069-1-2-1-2	7.0	4.5	5.5	6.5	6.0	42.5
87.303-1-1-1-4	5.5	4.5	5.5	6.5	5.5	42.5
HY9230	8.0	3.0	6.0	5.0	5.0	45.0
88.065-1-1-1-2	4.5	4.5	5.0	5.5	6.0	50.0
86.130-1-2-1-2-3	6.5	4.0	4.5	5.5	5.0	40.0
CC390	4.5	4.5	3.5	5.5	7.0	60.0
87-147-1-2-1-1	5.5	6.0	3.5	6.0	5.0	45.0
88.065-1-1-2-1	5.0	4.5	4.0	6.0	6.0	42.5

TOMATO BREEDING: UTILIZATION OP L. CHEESMANII - LA 317 - 1993

V. Poysa, Harrow Research Station

In 1993 we evaluated 38 'high solids' lines derived from L. cheesmanii LA317 in two replicated trials. These involved primarily backcross-1 (85-480) and backcross-2 (87-074) lines.

The adapted parent, cultivar Pur 812, had an average total solids level of 6.4%, while HY-9478 and CC-390 averaged 6.7% and 6.3%, respectively. The top LA317 derived lines had total solids of 7.2% to 8.7%. Even after 6 cycles of selection for soluble or total solids level, considerable variability for this trait was identified in sister lines. In total 39 plants from 13 lines were selected for further evaluation and breeding.

The average maturity (Mat), foliar disease resistance (Fdis), concentration of fruit set (Conc), fruit quality rating (firmness, colour and internal structure - Qrat), and yield (Yld), on a 1 to 9; (9=desirable) scale, and fruit size (Frsz), and total solids level (TS), of the top experimental lines, compared to the controls, is given below.

PEDIGREE	MAT	FDIS	CONC	QRAT	YLD	FRSZ	TS
87.074-6-3-1-1-2	5.0	3.5	2.5	4.5	4.5	32.5	8.750
87.074-3-2-1-1	5.0	5.0	2.0	4.0	4.0	32.5	8.345
85.480-2-8-2-1-3-1-1	5.5	2.0	4.0	5.5	3.5	42.5	8.015
85.480-2-8-2-1-2-1-1	4.5	5.0	4.0	6.5	5.5	55.0	7.805
85.480-2-8-2-1-2-1-2	6.5	3.5	4.0	5.5	5.0	37.5	7.800
85.480-2-8-2-1-2-5-2	3.5	4.0	2.0	7.0	4.5	55.0	7.595
85.480-2-8-2-1-2-6-2	5.0	3.0	3.0	7.0	4.5	52.5	7.550
85.480-2-8-2-1-2-5-3	5.5	4.0	3.5	6.5	6.5	52.5	7.350
85.480-2-8-2-1-3-1-2	6.0	2.0	4.5	6.5	4.5	47.5	7.350
85-480-2-8-2-1-1-3	7.0	2.0	4.0	7.0	5.5	45.0	7.160
HY9478	8.0	3.0	3.5	5.0	6.5	52.5	6.690
PUR812	7.0	4.0	5.0	6.0	6.0	47.5	6.415
CC390	6.5	2.5	4.0	7.0	8.0	65.0	6.255

TOMATO BREEDING: UTILIZATION OF L. CHEESMANII - 1993

V. Poysa, Harrow Research Station

In 1993 we evaluated 56 'high solids' lines derived from several *L. cheesmanii* lines. Experimental lines derived from LA 528, LA 1139, LA483, and LA 317 were selected which had fruits >30 g and fruit yields about 75% or more of the controls, while having total solids, of 6.8% to 8.6%, compared with 5.7% for Pur812. The highest total solids levels were in a relatively small fruited line derived from LA 483 (88.265), while selections from LA 1139 (88-260) combined good fruit size, fruit yields, and earliness with total solids levels considerably higher than the controls.

The average maturity (Mat), foliar disease resistance (Fdis), concentration of fruit set (Conc), fruit quality rating (firmness, colour and internal structure - Qrat), and yield (Yld), on a 1 to 9; (9=desirable) scale, and fruit size (Frsz), and total solids level (TS), of the top experimental lines, compared to the controls, is given below.

PEDIGREE	MAT	FDIS	CONC	QRAT	YLD	FRSZ	TS
88.265-1-1-1	4.5	3.0	2.0	4.5	4.5	30.0	8.570
89.079-1-1-2	6.0	3.5	1.0	4.5	5.0	47.5	7.685
89.079-1-1-1	5.0	3.5	1.5	4.5	4.5	50.0	7.525
88.260-14-4-1-2	5.0	3.0	2.0	5.0	5.5	45.0	7.205
89.081-1-2-1	6.0	3.0	3.0	5.5	5.5	42.5	6.920
88-321-2-3-1	6.0	3.0	3.0	6.0	4.5	40.0	6.905
89.060-2-1-1	7.0	2.0	4.0	5.0	4.5	42.5	6.870
88.310-1-1-1	5.5	3.5	2.0	6.0	5.0	42.5	6.870
88-322-3-1-1	7.0	3.5	2.5	4.5	5.0	42.5	6.845
88.260-14-4-1-1	6.5	3.0	2.5	7.0	5.5	50.0	6.825
HY9230	9.0	1.0	3.0	6.0	5.0	55.0	5.840
PUR812	7.5	4.0	4.5	7.0	7.0	50.0	5.670

TOMATO BREEDING: UTILIZATION OF L. CHMIELEWSKII - 1993

V. Poysa, Harrow Research Station

A major objective of the processing tomato breeding program is the development of lines with higher levels of total and soluble solids than are presently available in the adapted cultivars. For the last several years we have been developing lines derived from 'high solids' lines of L. chmielewskii and L. cheesmanii. In 1993 we evaluated several BC2-F6 to BC4-F4 lines derived from the L. chmielewskii lines, LA 1306 and LA 1327, along with two locally adapted check cultivars, in replicated trials.

The top experimental lines, selections from 87-331-1-1, had significantly higher levels of total solids than Pur812 or Chatham, although they were later, less concentrated in fruit set, smaller fruited, and lower yielding than the controls. Some selections were identified which had ~40 g fruit and reasonably high fruit yield, having >1% greater total solids.

The average maturity (Mat), foliar disease resistance (Fdis), concentration of fruit set (Conc), fruit quality rating (firmness, colour and internal structure - Qrat), and .yield (Yld), on a 1 to 9; (9=desirable) scale, and fruit size (Frsz), and total solids level (TS), of the top experimental lines, compared to the controls, is given below.

PEDIGREE	MAT	FDIS	CONC	QRAT	YLD	FRSZ	TS
87.331-1-1-2-1	6.5	2.5	2.5	3.0	2.5	27.5	8.765
87.331-1-1-1-1	2.5	2.5	1.0	3.0	3.0	27.5	8.025
87.331-1-1-3-1	4.0	2.5	1.5	5.0	5.0	37.5	7.855
87.331-1-1-2-2	4.5	4.5	2.0	5.5	6.5	40.0	7.670
87.331-1-1-2-3	3.5	4.5	1.0	5.5	5.5	40.0	7.370
86.172-1-1-1-1-1	4.0	2.0	2.0	6.5	5.5	40.0	7.220
CHATHAM	8.5	2.0	5.5	5.5	6.5	50.0	6.600
PUR812	7.0	4.0	7.0	7.0	6.5	47.5	5.705

INHERITANCE OF BACTERIAL CANKER RESISTANCE

V. Poysa, HRS.

The inheritance of high levels of resistance to bacterial canker in crosses between three sister lines, developed from a series of crosses combining two sources of moderate resistance to bacterial canker, and several adapted parents was evaluated following root dip inoculation.

The three resistant lines had average disease ratings **(DR)** of **4.6, 3.9,** and 3.7, on a 1=dead, 5=healthy scale. The seven susceptible parents had disease ratings between **1.3** and **2.2.** All F-1 populations evaluated had levels of resistance intermediate between the parents, but closer to the susceptible parents. In the **F-2** generation, from **6%** to 40% of the plants were as resistant as the resistant parent. It appears that this source of resistance is inherited in a quantitative manner, with a preponderance of recessive alleles conferring resistance. With an effective screening procedure for bacterial canker resistance, however, transfer of this resistance to better adapted lines should be feasible.

The percent resistant (DR=4-5), percent susceptible (DR=1-2), and average disease rating of the evaluated lines averaged over 4 reps, is presented below.

PEDIGREE	PERRES	PERSUS	AVRAT
BC-A	91	1	4.6
BC-B	68	8	3.9
BC-C	63	12	3.7
OH8245	8	55	2.2
ACX8412	6	59	2.0
CC7107	0	83	1.5
184-411-2-4-2	7	71	1.8
184-103-6-3-2-1	1	66	1.7
185-220-3-1-1	10	56	2.1
NC8288	0	95	1.3
91-111-F1	15	48	2.41
91-114-F1	24	29	2.8
91-111-F2	27	44	2.6
191-114-F2	13	55	2.2
91-112-F2	6	67	1.9
91-115-F1	13	55	2.2
91-116-F1	26	47	2.6
91-117-F1	0	85	1.5
91-115-F2	12	55	2.2
91-116-F2	20	49	2.4
91-119-F1	36	24	3.0
91-120-F1	21	42	2.4
91-119-F2	40	34	3.0
91-120-F2	36	37	2.9
91-121-F2	9	64	2.0
!HAWAII-7998	8	80	1.5
IRAT-L3	19	65	2.0
PUR812	3	81	1.5

WHOLEPACK TOMATO BREEDING, 1993

S.A. Loewen, Ridgetown College of Agricultural Technology

Wholepack tomato breeding plots were set out again in 1993 as part of an ongoing project designed to address the cultivar needs of wholepack tomato processors in Ontario. The breeding plots occupied 14 acres of field space. Over 600 selections were made. The selections will be screened in the greenhouse for resistance to fusarium, verticillium, and bacterial speck resistance. The work will continue to emphasize high yields combined with good fruit colour, early maturity and disease resistance during selection.

PROCESSING TOMATO QUALITY TRIAL, 1993

S.A. Loewen, Ridgetown College of Agricultural Technology

Processing Tomato Quality Trial, 1993. Results of Lab Evaluations on Juice Samples.

Name	Agtron	Soluble Solids	pH	Bostwick (cm)
CC 164	26.0	5.3	4.29	5.1
CC 193	24.8	4.7	4.40	5.8
CC 218	25.3	5.8	4.34	5.5
CC 329	27.8	4.6	4.30	7.4
CC 390	24.0	6.6	4.38	6.7
CC 71-22	24.0	5.7	4.37	7.4
H 9201	27.5	5.0	4.27	7.2
H 9230	25.3	5.6	4.25	7.2
H 9478	29.7	6.3	4.33	6.1
HRS 9203	23.2	6.3	4.29	6.7
HRS 9204	24.8	4.8	4.25	6.7
N 836	24.8	5.7	4.30	5.2
Ohio 7983	27.7	5.4	4.27	7.6
Ohio 8245	24.7	6.3	4.32	6.5
OX-38	29.5	5.5	4.34	6.5
Peto 696	27.2	6.3	4.31	7.5
Peto 2196	26.3	5.5	4.24	7.9
RCAT 9203	27.2	6.0	4.38	6.7
RCAT 9209	24.0	6.7	4.31	5.6
RCAT 931	28.3	6.1	4.30	7.0
RCAT 932	24.0	7.3	4.34	5.4
RCAT 933	23.0	5.7	4.36	6.9
RCAT 934	25.7	5.2	4.37	6.8
RCAT 935	28.2	5.6	4.31	7.8
RCAT 936	24.8	4.8	4.33	7.4
RCAT 937	28.0	4.4	4.29	7.4
SO-12	29.0	5.6	4.29	6.7

PROCESSING TOMATO PEELING TRIAL, 1993

S.A. Loewen, Ridgetown College of Agricultural Technology

Tomato fruit samples were collected at the time of harvest from the yield trials and submitted to the peeling and canning line at RCAT. After simulated mechanical handling samples were immersed in caustic potash and the peels mechanically removed. In addition to other measurements, percent canning recovery was calculated. Percent canning recovery shows the percent, by weight, of tomatoes put into the caustic, that are of good enough quality to be put into a can. A high percent canning recovery indicates relatively easy peel removal and a high percent of fruit with good peeled colour.

Processing Tomato Peeling Trial, 1993. Percent Canning Recovery.

Name	Canning Recovery (%)
CC 164	57.0
CC 193	55.2
CC 218	67.4
CC 329	54.7
CC 390	58.8
CC 71-22	60.5
H 9201	40.1
H 9230	43.8
H 9478	54.7
HRS 9203	66.9
HRS 9204	61.8
N 836	52.7
Ohio 7983	54.7
Ohio 8245	61.8
OX-38	39.7
Peto 696	52.5
Peto 2196	57.8
RCAT 9203	64.4
RCAT 9209	71.7
RCAT 931	52.7
RCAT 932	61.1
RCAT 933	68.2
RCAT 934	52.7
RCAT 935	58.3
RCAT 936	61.5
RCAT 937	56.2
SO-12	57.2

WEED CONTROL IN TRANSPLANTED TOMATOES — ECW/EDI-2.4

O'SULLIVAN J, BOUW W J — EXPERIMENT ID: TOHB9301

CROP: TOMATO (H-1350). PLANTED: 93/06/04. PLANTING METHOD: TRANSPLANTED. FERT BROADCAST ON 93/05/05 AT 1000 KG/HA PROD WITH 10-10-10 PREV CROPS: RYE, FALL (92). FIELD EXPT. EXPT DESIGN: RANDOMIZED COMPLETE BLOCK. REPS: 4. PLOT SIZE: 1.5 X 7.0M. PLOT AREA: 10.5 SQ M. CROP ZONE: 999. EXPT LOCATION: SIMCOE, ON. WEATHER STN: SIMCOE, ON.
ACTUAL PPT(MM): APR: 81.8, MAY: 60.6, JUN: 79.0, JUL: 12.8, AUG: 43.0.ACTUAL TEMP(C): APR: 7, MAY: 13, JUN: 19, JUL: 22, AUG: 22.

SITE DESCRIPTION: SOIL TEXTURE: SANDY LOAM. %OM: 2, %SAND: 55, %SILT: 30, %CLAY: 15, SOIL PH: 6.6.
MATERIALS AND METHODS: LIQUID FORMULATIONS APPLIED WITH A SELF-CONTAINED ONE MAN OPERATED PESTICIDE SPRAYER (SCOMOPS) USING COMPRESSED AIR AS A SOURCE OF PRESSURE. OTHER HERBICIDE #1: DPX E9636 (ELIM). OTHER ASSESSMENT #1 IS A RATING OF PLANT INJURY ON A 0-100 SCALE. OTHER ASSESSMENT (FOR ASSESSMENTS #2-#7) IS A BIOMASS WHICH IS CALCULATED BY MULTIPLYING THE AVERAGE NUMBER OF PLANTS/MSQ X THE AVERAGE HEIGHT OF EACH SPECIES. OTHER ASSESSMENT (FOR ASSESSMENTS #8-#9) IS A VISUAL RATING OF UEED CONTROL.

TRT #	APPL INFO# V	GROWTH ST INFO# V	INCORP INFO# V	MIX	MANAGEMENT	RATE KG/HA (AI)	% CONC	TOMATO %INJUR OTHER ASSESS	BLACK N-SHAD EASTER OTHER ASSESS	HAIRY N-SHAD OTHER ASSESS	SHEPHE PURSE OTHER ASSESS	LAMBS QUARTE OTHER ASSESS	OTHER WEED BLU OTHER ASSESS	CRAB GRASS OTHER ASSESS	OTHER WEED BLW VISUAL 0-100	OTHER WEED GRASS VISUAL 0-100	TOMATO H-1350 YIELD T/HA
1	1	1			METRIBUZIN	.3	75WG	0	308	328	0	0	0	0	50	100	19.0
	2	2			FLUAZIFOP-P-BUT	.175	12.5EC										
2	1	1			METRIBUZIN	.3	75WG	0	185	263	0	0	4	0	58	100	14.6
	2	2		T	FLUAZIFOP-P-BUT	.175	25WG										
					CHARGE	1.0	100EC										
3	1	1		T	METRIBUZIN	.3	75WG	0	358	244	0	0	0	0	51	98	9.9
					FLUAZIFOP-P-BUT	.175	25WG										
					CHARGE	1.0	100EC										
4	1	1		T	METRIBUZIN	.3	75WG	0	219	0	0	0	0	96	61	90	27.2
					OTHER HERB #1	.015	25WG										
5					CHECK (WEEDY)			0	74	114	313	18	2656	1227	0	0	1.8
6					CHECK,WEED FREE			0	0	0	0	0	0	0	100	100	37.0
					SAMPLE SIZE (SQ.M)												
					NUMBER OF SAMPLES												
					DATE ASSESSED (YYMMDD)			930702	930705	930705	930705	930705	930705	930705	930720	930720	930908
					LEAF RANGE												
					HEIGHT (CM)												
					GROWTH STAGE												
					PLANT DENSITY (PL/SQ.M)												

CHARGE -CHP; FLUAZIFOP-P-BUTYL -CHP; METRIBUZIN -CHH; OTHER HERBICIDE #1 -DUQ;

APPLICATION INFORMATION

APPL INFO#	SOL VOL L/HA	TOT SPR L/HA	PRES KPA	APPLICATION TIMING	METHOD	HT M	TEMP C	HUMID %	WIND KM/HR	DATE	TIME	RAINFALL (MM/WK) BEFORE	AFTER	SECOND	1ST SIG. RAIN DAYS	MM
1	300		175	POST-E	VEHICLE MNT SPR					93/06/16						
2	300		175	POST-E	VEHICLEMNT SPR					93/06/24						

GROWTH STAGE INFORMATION / INCORPORATION INFORMATION

GROWTH STAGE INFO#	PLANT	(VARIETY)	BBCH MN	BBCH MX	UDOKS MN	UDOKS MX	LEAF MN	LEAF MX	LEAF MJ	HEIGHT (CM) MN	HEIGHT (CM) MX	HEIGHT (CM) MJ	GROWTH STAGE	DENS PL/M2	INCORP INFO#	DATE	TYPE	DEP CM
1	TOMATO									12	15							
	OTHER WEED	(BLW)							4	0.5	2							
	OTHER WEED	(GRASS)							2			1						
2	TOMATO						7	8		25	30							
	OTHER WEED	(BLW)								2	5							
	OTHER WEED	(GRASS)					2	3										

CONCLUSIONS: NO HERBICIDE CAUSED ANY CROP PHYTOTOXICITY. NIGHTSHADE WAS THE MAIN BROADLEAF UEED PRESENT. THIS INCLUDED EASTERN BLACK NIGHTSHADE AND HAIRY NIGHTSHADE OR POTATO UEED. THERE **WAS** EXTREMELY HEAVY GRASS PRESSURE. FLUAZIFOP-P-BUTYL GAVE VIRTUALLY **100%l GRASS** CONTROL. GRASS CONTROL **WAS** REDUCED WITH DPX **E9636. METRIBUZIN** GAVE REDUCED BROADLEAF CONROL MAINLY DUE TO THE PRESENCE OF NIGHTSHADE. DPX **E9636** CONTOLLED HAIRY NIGHTSHADE BUT NOT EASTERN BLACK NIGHTSHADE. METRIBUZIN GAVE GOOD TO EXCELLENT CONTROL OF PURSLANE. YIELDS WERE SIGNIFICANTLY REDUCED WITH SEVERAL TREATMENTS DUE TO LATE UEED INFESTATIONS. (HORTICULTURAL RES INSTITUTE OF ONTARIO, SIMCOE).

Overwintering of Colorado potato beetles in and around tomato fields

D. W. A. Hunt, Agriculture Canada, Research Station. Harrow, Ontario NOR 1G0

Fields that had been planted in tomatoes the previous summer were sampled in the early spring to determine the densities of overwintering adults, the distribution of beetles at various depths in the soil, the survival at various depths, and the effects of various cover crops on abundance and survival. Cover crop plots were established at HRS, and samples were taken from these plots as well as from several tomato fields around Essex county. In all of these fields several 1 m x 1 m soil samples were excavated and then seived through a large mesh screen to remove the beetles.

Within fields that had been planted in tomatoes the previous summer an average of 5 beetles were found per m^2 of soil. This density remained relatively consistent for fields thal had been planted in a variety of cover crops following harvest. The only areas that contained higher densities of overwintered adults were those where a cover crop was not planted and the tomato crop residue was not disced under. Densities of 40 - 50 per m^2 were found within these fields. In addition, very high densities of overwintering adults (several hundred per m^2)were found in the soil in wooded areas adjacent to tomato fields.

The majority of beetles were found at depths of 20 - 30 cm, and survival was somewhat higher at greater depths. In fields around Harrow there was a consistent change in the soil profile at approximately 30 cm. Below 30 cm the soil had a significantly higher bulk density, and beetles did not enter this layer.

The results of this study *suggest* that only a small proportion of Colorado potato beetles overwinter in tomato fields. The only exception to this is where crop residue is allowed to remain on the surface. This residue probably provides a food source that holds the beetles in the field until they are ready for diapause. The high densities of beetles found in wooded areas adjacent to fields suggest that newly emerged adults in the spring could be partially controlled with trap crops and trenches placed between the overwintering sites and tomato fields.

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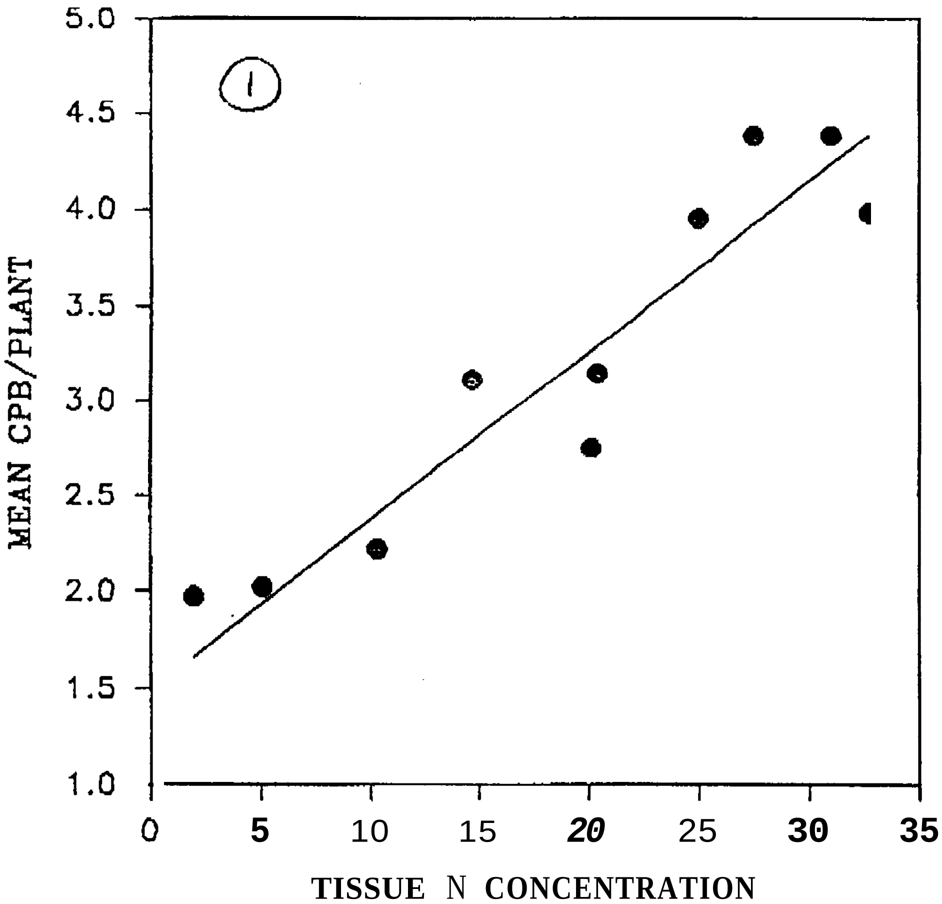
Effects of nitrogen concentration and hardening of tomato transplants on Colorado potato beetle abundance

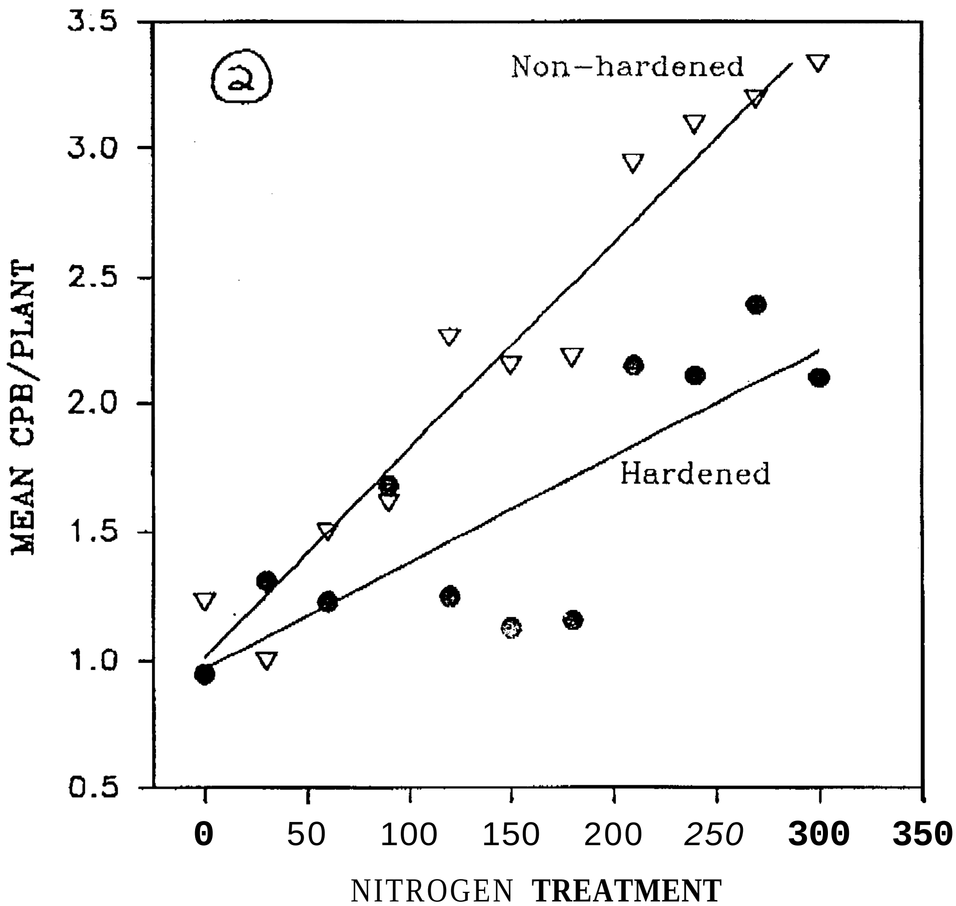
D. W. A Hunt, Agriculture Canada, Research Station, Harrow, Ontario NOR 1G0

Locally-grown tomato plug plants have been found to bc much more attractivc to thc Colorado potato beetle than southern bare-root plants which were previously used us transplants in southwestern Ontario. This increased attractiveness results in tomato plants which are very susceptible to beetle damage. In cooperation with Drs. Albert Liptay and Lorna Woodrow studies were conducted to determine the effects of various growing practices for plug transplants on Colorado potato beetle abundance.

We have established that tomato plug plants thnt contain higher concentrations of nitrogen in the tissue are more attractive to the Colorado potato beetle (Fig 1). Plug plants which were exposed to several days of outdoor conditions before planting, a common practice For hardening these plants to decrease sand blasting damage, were somewhat less attractive the adult beetles (Fig 2). More research is required in order to determine which growing conditions will result in hardened plants which establish well in the field and are resistant to Colorado potato beetle feeding.

The discovery that host plant nitrogen content affects Colorado potato beetle host preference may have an impact on our attitudes about fertilizer use in plug transplant production. The positive correlation between foliar nitrogen content and host preference indicates that the use of large quantities of nitrogen fertilizer may worsen infestations of this insect, and necessitate increased reliance on insecticides. A compromise is required in order to apply quantities of fertilizer which are adequate for proper growth of the plants without the application of excessive quantities which may increase damage due to the beetles.


1
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
MEAN CPB/PLANT
0
5
10
15
20
25
30
35
TISSUE N CONCENTRATION



2
Non-hardened
Hardened
MEAN CPB/PLANT
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0
50
100
150
200
250
300
350
NITROGEN TREATMENT

Colorado potato beetle damage in processing tomatoes grown under reduced tillage and conventional tillage

D. W. A. Hunt, Agriculture Canada, Research Station, Harrow, Ontario NOR 1G0

The objective of this study was to examine the abundance of Colorado potato beetles and resultant crop damage in processing tomatoes grown under reduced tillage and conventional tillage. This study was conducted in cooperation with Dr. Al Hamill.

Four treatments were evaluated in a completely randomized block design: no rye, no insecticide; no rye, weekly Guthion sprays; rye, no insecticide; rye, weekly Guthion sprays. Plots were bedded and seeded with *rye* in the fall. In the spring the "no rye" plots were sprayed with glyphosate and bedded to remove the residue from the surface. When the rye in the "rye" plots was approximately 15 cm high a band of glyphosate was applied to within 20 cm of the edges of the beds. The remaining *rye* in the "rye" plots was sprayed with glyphosate just before the tomatoes were planted. The rye residue was left undisturbed in the "rye" plots following planting.

The "rye" plots were infested with significantly fewer Colorado potato beetles than the "no rye" tomatoes. Rye residue protected the tomato plants from beetle infestation as effectively as a weekly insecticide spray. However, rye residue was responsible for a reduction in tomato yields of approximately 10%, as well as a slight delay in maturity,

Damage thresholds for Colorado potato beetles in processing tomato fields

D. W. A. Hunt, Agriculture Canada, Research Station, Harrow, Ontario NOR 1G0

The objective of this study was to establish a damage threshold far the Colorado potato beetle on determinate tomato cultivars used by the processing industry in Ontario. Establishing a spray threshold for the CPB on processing tornalocs would enable growers to reduce the number of unneccesary sprays used against this insect. This would result in a cost savings due to the elimination of some spray applications and would slow the development of insecticide resistance in local CPB populations.

Plots of a determinate processing tomato cultivar were established at HRS. Immediately following planting tomato beds were covered with a woven row cover suspended on metal hoops. The mesh on this screening was coarse enough to allow for normal plant development, but fine enough to prevent the escape of CPB. Newly emerged CPB adults were released into these enclosures at densities of 0, 0.6, 1.3, 2.6, and 5.1 adults/plant. For the first year of this study only early season damage from adult feeding was evaluated, and eggs were removed to eliminate larval feeding. Insect counts and visual ratings of defoliation were taken weekly. Plots were harvested and the effect of CPB density on yield, maturity and quality determined.

The two highest adult densities of 2.6 and 5.1 adults/plant resulted in 100% defoliation of the transplants and none of the plants recovered. Densities of 0.6 and 1.3 adults/plant resulted in moderate levels of defoliation, however the plants recovered completely and yield und maturity data collected from these treatments were not significantly different from the control cages that were free of beetles. This suggests that the damage threshold for adult CPB on young plug transplants is approximately 2 adults/plant.

IMPACT of herbicide residues 1 year after application on vegetables. O'Sullivan, J. and W.J. Bouw. Experiment location - H.E.S., Simcoe; Crops - Cucumber (Flurry), Tomato (H-8814), Cabbage (Polar Green), Potato (Norchip), Sweet Corn (Sweet Belle) and Pepper (Midway); Soil type - Barrien sandy loam; O.M. - 1.95%; pH. - 6.1%; Sand - 55%; Silt - 30%; Clay - 15%; Fertilizer - 1000 kg/ha 10-10-10; Plantina date - Potato - May 6, Cucumber - May 26, Cabbage - June 7, Tomato, Sweet Corn and Pepper - June 22; In row spacing - Cucumber 15 cm, Tomato, Cabbage and Pepper 45 cm, Potato and Sweet Corn 25 cm; Row width - 1.5 m; Plot size - 7.0 m x 1.5 m; Experimental desisn - randomized block design; Replicates - 4; Previous crop - rye cover crop; AT APPLICATION Date and method - May 20, 1992 - ppi, May 22, 1992 - pre; Equipment - SCOMOPS; Volume - 300 L/ha; Pressure - 175 kPa; Rainfall - May 6/93 to Sept. 24/93 - 216.2 mm; Date of assessment - crop injury - Cucumber and Cabbage - July 2, Tomato and Potato - July 15, harvest - Cabbage - July 21, Cucumbers - July 23, Potato - Aug. 31, Sweet Corn - Sept. 8, Pepper - Sept. 24, Tomato - Sept. 27.

Treatment	Rate (kg/ha)	Cucumber		Tomato		Cabbaae		Potato		Sweet Corn		Pepper	
		Injury (%)	Yield (t/ha)	Injury (%)	Yield (t/ha)	Injury (%)	Yield (t/ha)	Injury (%)	Yield (t/ha)	Injury (%)	Yield (t/ha)	Injury (%)	Yield (t/ha)
DE-498	0.07	4.0	24.0	0.5	14.3	19.0	9.5	2.5	6.2	n/a	n/a	n/a	9.6
DE-498	0.14	6.5	19.8	9.5	11.9	38.0	4.3	7.5	4.3	n/a	n/a	n/a	6.3
Check		0.0	21.1	0.0	14.2	0.0	19.3	1.5	5.0	n/a	n/a	n/a	11.5
Imazethapyr	0.10	1.5	22.0	7.5	16.1	5.5	21.9	7.0	3.9	n/a	8.9	n/a	n/a
Imazethapyr	0.20	5.0	21.3	15.0	7.1	18.0	14.9	10.0	1.6	n/a	7.9	n/a	n/a
Check		0.0	23.9	0.0	23.2	0.0	25.3	0.0	4.9	n/a	6.3	n/a	n/a

DE-498 did not cause any injury to cucumbers. There was significant injury to cabbage at the 1X and 2X rates of application. Other crops do not appear to be damaged. Pursuit is causing significant injury to tomatoes, potatoes and cabbage. DE-498 or imazethapyr did not cause any yield reduction in cucumbers. There is a significant yield reduction in cabbage at the 1X and 2X rate of applications for both herbicides. Yields of other crops were not significantly reduced. (Horticultural Experiment Station, Simcoe, Ontario).

IMPACT of **imazethapyr** residue 2 years after application on vesetables. O'Sullivan, J. and W.J. Bouw. Experiment location - H.E.S., Simcoe; Crops - Cucumber (Flurry), Tomato (H 2653), Cabbage (Polar Green), Potato (Norchip) and Sweet Corn (Sweet Belle); Soil type - Barrien sandy loam; O.M. - 2.81%; pH. - 5.7%; Sand - 55%; Silt - 30%; Clay - 15%; Fertilizer - 1000 kg/ha 10-10-10; Planting date - Potato - May 6, Sweet Corn - May 26, Cabbage - June 7, Tomato - June 9, Cucumber - June 17; In row spacing - Cucumber 15 cm, Tomato and Cabbage 45 cm, Potato and Sweet Corn 25 cm; Row width - 1.5 m; Plot size - 7.0 m x 1.5 m; Experimental desian - randomized block design; Replicates - 4; Previous crop - rye cover crop; AT APPLICATION Date and method - May 16, 1991 - pre; Equipment - SCOMOPS; Volume - 300 L/ha; Pressure - 175 kPa; Rainfall - May 6/93 to Aug 31/93 - 191 mm; Date of assessment - crop injury - Cucumbers July 15, all other crops - July 2, harvest - Cabbage - July 21, Cucumbers - July 30 and Aug 1, Sweet Corn - Aug. 30, Potato and Tomato - Aug. 31.

	% Injury Imazethapyr (kg/ha)			Marketable Weight/fruit (g) Imazethapyr (kg/ha)			Marketable Yield (t/ha) Imazethapyr (kg/ha)		
Crop	0.0	0.1	0.2	0.0	0.1	0.2	0.0	0.1	0.2
Cucumber	0.0	4.0	4.0	n/a	n/a	n/a	12.4	10.7	10.1
Tomato	0.0	1.5	4.0	n/a	n/a	n/a	38.4	41.1	38.1
Cabbage	0.0	4.0	5.0	1025	1056	907	19.0	19.6	16.8
Potato	0.0	0.0	0.0	71	51	34	4.3	6.5	2.8
Sweet Corn	0.0	0.0	0.0	343	338	317	13.5	16.6	20.8

Vegetable crops grown in rotation 2 years after Imazethapyr application were not affected by residues of this herbicide. No crop phytotoxicity or reduced yields were recorded with any crop. (Horticultural Experiment Station, Simcoe, Ontario).

ICAR IDENTIFICATION NUMBER: **61002036**

CROP: Potatoes, cv. Superior

PEST: Colorado Potato Beetle, Leptinotarse decernlineata (Say)

NAME AND AGENCY:
PITBLADO, R.E.
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Phone: (519) 674-5456 Fax: (519) 674-3504

TITLE: USE OF INSECTICIDES ON A POTATO INSECT TRAP CROP FOR FIELD TOMATOES

MATERIALS: THIMET 15G (phorate), ADMIRE 240FS (imidacloprid)

METHODS: Potatoes were planted in single row plots around the perimeter of a tomato range at RCAT. The plots were 8m in length, replicated two times planting one set of treatments on the east side of the tomato field, the other set on the west side. The treatments were in reverse order from one side to the other. Potato seed pieces were planted with a commercial planter on May 8. The granular insecticide was applied in a 15 cm. band in furrow prior to planting while the liquid insecticides were sprayed in a 15 cm band either in furrow or over the row after planting. Assessments were taken by counting Colorado Potato Beetle larvae on June 30 and July 12 and foliar damage ratings on July 2 and 28.

RESULTS: As presented in the tables below

CONCLUSIONS: ADMIRE 240FS sprayed in furrow provided outstanding Colorado Potato Beetle control throughout the season. This treatment allowed the potato plant to retain its foliage thus being most effective as a beetle trap crop, protecting the tomato crop from CPB attack. The band application of ADMIRE 240FS sprayed over the row after planting was also effective early in the season, maintaining excellent foliage coverage for the most critical 1st generation CPB attraction, however, plants became defoliated later in the season. THTMET 15G was ineffective, resulting in significant loss of foliage rendering this treatment ineffective as a potato trap crop treatment.

RESULTS:

Treatments	Rate prod/100m	Application	CPB Larval Counts June 30	CPB Larval Counts July 12	Foliar Damage Ratings* (0-10)1/ July 12	Foliar Damage Ratings* (0-10)1/ July 28
THIMET 15G	224.0 gm	In Furrow	40.0b*	185.0b	7.0b	3.0c
ADMIRE 240FS	9.0 ml	In Furrow	0.0b	2.0c	9.8a	9.0a
ADMIRE 240FS	9.0 ml	Band	0.0b	52.5bc	9.8	6.0b
Control			200.0a	500.0a	5.5c	0.1d

*Means followed by the same letter are not significantly different (P<0.05 Duncan's multiple range test)

1/ Foliar Damage Ratings (0-10) - 0, no control, foliage severely damaged; 10, complete control

ICAR IDENTIFICATION NUMBER: . **61006535**

CROP: Potatoes cv. Superior

PEST: Colorado Potato Beetle, Leptinotarsa decemlineata (Say), Potato Leafhopper, Empoasca fabae (Harris)

NAME AND AGENCY:

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TITLE: PESTICIDE TIMING (BACK TO BACK - EXTENDED INTERVALS) AND ITS EFFECT ON INSECT CONTROL IN POTATOES

MATERIALS: GUTHION 240SC (azinphos-methyl), DECIS 5.0 FL (deltamethrin)

METHODS: Potatoes were planted in two row plots, 6m in length with rows spaced 1m apart, replicated 4 times in a randomized complete block design. Potato seed pieces were planted with a commercial planter on April 30. Spray applications were made using a back pack airblast sprayer using 240 L/ha of water. Spray timing was scheduled either every 7 days with and without a back to back spray (sprayed again 3 days later) or every 14 days with and without a back to back spray (again 3 days later). The 7 day spray schedule was June 21, 29, July 5 and 12. The 14 day spray schedule was June 21 and July 5.
Assessments were taken by counting Colorado potato beetle (CPB) larvae at intervals throughout the summer, foliage damage ratings caused by leafhoppers and potato beetle damage on July 2 and July 13 and potato yields on Aug. 17.

RESULTS: As presented in the tables below

CONCLUSIONS: High Colorado potato beetle pressures were observed. Foliar insecticides applied every 7 days proved more effective in reducing insect numbers but had no significant effect on yields compared to the extended spray schedules of 14 days. Beetle numbers were best reduced when sprays were applied at half rates every 7 days followed within 3 days with an additional application again at half rates - what is referred to as "back to back spraying. GUTHION 240SC provided a higher level of CPB control than DECIS 5.0 Fl observed on July 13 at the end of the 1st generation.

RESULTS:

Table 1. Colorado Potato Beetle Counts

Treatments	Rate product/ha	Application	CPB Larval Counts June 28	July 2	July 5	July 9
GUTHION 240SC	1.75 l	7 DAYS	160.0bc*	500.0a	135.0b	10.5c
GUTHION 240SC	1.75 L	14 DAYS	180.0bc	500.0a	290.0a	50.0abc
GUTHION 240SC	0.875 L	BB 7 DAYS	102.5c	172.5b	157.5b	17.5c
GUTHION 240SC	0.875 L	BB 14 DAYS	145.0bc	500.0a	272.5a	23.5bc
DECIS 5.0 FL	100.0 ml	7 DAYS	147.5bc	500.0a	295.0a	95.0ab
DECIS 5.0 FL	100.0 ml	14 DAYS	152.5bc	500.0a	290.0a	120.0a
DECIS 5.0 FL	50.0 ml	BB 7 DAYS	127.5bc	193.8b	287.5a	95.0ab
DECIS 5.0 FL	50.0 ml	BB 14 DAYS	140.0bc	500.0a	300.0a	95.8ab
Control			300.0a	500.0a	300.0a	17.8c

Table 2. Insect Damage and Yield Results

Treatments	Rate product/ha	Application	Foliar Ratings (0-10)1/ Leafhoppers July 2	CPB July 13	Yield kg/plot Aug. 17
GUTHION 240SC	1.75 L	7 DAYS	8.3a*	8.5a	7.3ab
GUTHION 240SC	1.75 l	14 DAYS	8.9a	8.3a	7.0ab
GUTHION 240SC	0.875 L	BB 7 DAYS	8.1a	9.0a	8.0ab
GUTHION 240SC	0.875 L	BB 14 DAYS	8.6a	7.0ab	8.5a
DECIS 5.0 FL	100.0 ml	7 DAYS	8.1a	3.5cd	7.5ab
DECIS 5.0 FL	100.0 ml	14 DAYS	9.0a	2.8cd	7.3ab
DECIS 5.0 FL	50.0 ml	BB 7 DAYS	8.0a	4.8bc	7.0ab
DECIS 5.0 FL	50.0 ml	BB 14 DAYS	8.1a	3.8cd	7.3ab
Control			7.8a	1.5d	5.5b

* Means followed by the same letter are not significantly different (P<0.05 Duncan's multiple range test)

1/ Foliar Ratings (0-10) - 0, no control, foliage severely damaged; 10, complete control

ICAR IDENTIFICATION NUMBER: **61002036**

CROP: Potatoes, Tomatoes

PEST: Colorado Potato Beetle, Leptinotarsa decemlineata (Say)

NAME AND AGENCY:
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TITLE: USE OF THE DIP TEST TO DETERMINE THE CHOICE OF INSECTICIDES FOR THE CONTROL OF CPB IN POTATOES

MATERIALS: GUTHION 240SC, 360Fl (azinphos-methyl), CYMBUSH 250EC (cypermethrin), AMBUSH 500EC (permethrin), SEVIN XLR PLUS (carbaryl), DECIS 2.5E (deltamethrin), THIODAN 4EC (endosulfan), ADMIRE 240FS (imidacloprid)

METHODS: CPB adults were collected from 6 separate potato or tomato fields east of Learnington and at Ridgetown College during the summer. The initial choice of fields were through growers indicating a ""heavy" insect population attacking their tomatoes. Large numbers of beetles were field collected then divided into groups of 30 adults per treatment. The beetles were placed into a strainer and dipped into a freshly prepared insecticidal mixture for approximately 8-10 seconds, then let drain, placed on absorbant towels for about 30 seconds. The treated beetles were then placed into paper cups with a perforated lid to allow for air exchange. Beetles were evaluated 24 hours after treatment.

RESULTS: As presented in the tables below

Table 1

Treatments	Rate	Dip Rate/L
GUTHION 240 SC	1.75 L pr/ha	6.3 ml
GUTHION 360 FL	1.17 L pr/ha	4.2 ml
CYMBUSH 250 EC	140.0 ml pr/ha	0.5 ml
AMBUSH 500 EC	200.0 ml pr/ha	0.7 ml
SEVIN XLR Plus	1.25 L pr/ha	4.5 ml
DECIS 2.5 EC	200.0 ml pr/ha	0.7 ml
THIODAN 4 EC	1.4 L pr/ha	5.0 ml
ADMIRE 240 FS	150.0 ml pr/ha	0.5 ml
Control		

Table 2

Field Location	% CPB Control GUTHION 240SC	GUTHION 360FL	CYMBUSH	AMBUSH	SEVIN	DECIS XLR	THIODAN	ADMIRE	Control
1/ W.Brown-A	87	-	97	80	60	83	13	87	73
W.Brown-B	83	67	63	67	77	60	63	80	67
2/ R.Johnston-A	100	100	100	77	73	97	83	100	90
R.Johnston-B	90	73	87	97	83	90	73	67	63
3/ RCAT-A	93	70	83	77	73	56	86	80	70
4/ Trial-RCAT	70	-	12		-	50	45	-	0
CT	67	-	27	-	-	13	80	-	3

1/ W.Brown-A - tomato field east of Learnington - June 7, adults
W.Brown-B - tomato field east of Leamington - July 8, larvae
2/ R.Johnston-A - tomato research plot east of Learnington - June 14, adults
R.Johnston-B - tomato research plot east of Leamington - July 6, adults
3/ RCAT -A - potato research plot - RCAT - July 6, larvae
4/ Trial - larvae collected at RCAT and evaluated using the dip test conducted at RCAT and by the Crop Technology personnel (CT) at the Kent County Fertilizer location

RESULTS: The dip test conducted at RCAT showed differences between spray materials. It was most disturbing, however, the high mortality observed in the control containers suggesting the procedure used needed to be modified. A "trial" was conducted where Colorado potato beetle larvae were collected at one site on the RCAT college potato research area and evaluated by a modifiedd RCAT method and the standard dip evaluation now being conducted by the Crop Technology (CT) specialists in the area.

The improvements in the technique now used by RCAT is the dipping time has been reduced to a quick dip rather than a 10 second "drowning", more holes in the top of the caps providing greater ventillation, more potato foliage is being added to the container both providing more food for insect recovery as well as allowing for areas where the surviving beetles can climb off the bottom for better ventillation. A lamp was also used to warm up the beetle to speed up their recovery period for those that survived the treatment. It was found, however, that the criteria of counting any movement at all over a period of 10-15 minutes under the heat lamp is both time consuming and possibly less than accurate for all types of chemicals used. It was noted that the legs of beetles treated with CONFIDOR continually moved or twitched for 2 days after treatment. It was uncertain whether using the "minimum twitch" criteria would denote those beetles as alive, when in fact their ability to do damage to foliage was over.

CONCLUSIONS: The dip test appears to be able to separate differences between treatments. It is critical, however, that the technique is performed properly.

ICAR IDENTIFICATION NUMBER: 61002036

CROP: Field Tomatoes, cv. Heinz 9478

PEST: Colorado Potato Beetle, Leptinotarsa decemlineata (Say)

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TITLE: SIMULATED COLORADO POTATO BEETLE DAMAGE AND ITS EFFECT ON YIELDS IN FIELD TOMATOES

MATERIALS: BRAVO 500 (chlorothalonil)

METHODS: Tomatoes were tranplanted on May 15 in single twin row plots spaced 1.65m apart. Plots were 8m in length, replicated 4 times in a randomized complete block design. On May 27, 12 days after transplanting 8 or 16 transplants were either completely defoliated or half of each leaflet was removed, as indicated in treatments 1 to 5. Treatments 6 and 7 were allowed to become established prior to treatment. These plants were either completely defoliated or half of each leaflet was removed on June 17, 33 days after transplanting. Assessments were taken by rating plot foliage cover and vigour on July 2, 28 and Aug. 10. Yields were taken on Aug. 31

RESULTS: As presented in the tables below

CONCLUSIONS: Significant loss in tomato yield was observed only when transplants were completely defoliated in a row. If successive plants were only half defoliated within a week after transplanting and were not injured beyond that time no loss in yield occurred. Also if every other plant was completely defoliated early in the season the healthy plants apparently were able to compensate with no loss in yield. Once plants became established even a one time complete defoliation 4 weeks after transplanting the plants were able to regrow with no loss in tomato yield.

RESULTS:

Treatments	Weeks After Transplanting	Plant Vigour Ratings (0-10)1/ July 2	July 28	Aug. 10	Yield T/ha Aug. 31
16 transplants completely defoliated	1	1.3d*	4.3e	6.3bc	32.03c
16 transplants with half of each leaflet defoliated	1	9.0a	8.8ab	9.3a	63.55ab
8 transplants (50%) completely defoliated - in a row	1	2.3d	5.5de	5.7c	32.10c
8 transplants (50%) completely defoliated - every other plant	1	7.0b	7.0cd	7.3abc	71.30a
8 transplants (50%) completely defoliated - two defoliated, one healthy	1	5.3c	6.3cd	6.7bc	52.57b
16 transplants completely defoliated	4	5.3c	7.8bc	7.3abc	58.69ab
16 transplants with half of each leaflet defoliated	4	8.7a	9.0ab	9.7a	62.05ab
No damage		8.7a	9.5a	8.3ab	65.41ab

*Means followed by the same letter are not significantly different ($P<0.05$ Duncan's multiple range test)

1/Plant Vigour Ratings (0-10) - 10, **healthy** foliar growth; 0, poor growth

ICAR IDENTIFICATION NUMBER: 61002036

CROP: Field Tomatoes, cv. Heinz 9478

PEST: Early Blight, Alternaria solani (Ell. & Mart.) L.R. Jones & Grout; Septoria Leaf Spot, Septoria lycopersici, Speg.

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TITLE: EVALUATION OF TOMATO FUNGICIDES

MATERIALS: BRAVO 500 (chlorothalonil), FOLPAN 50W (folpet), CAPTAN 75WG (captan), MANZATE 75DG (mancozeb), DITHANE 75DG (mancozeb), RHC-378 (surfactant), DITHANE M-45 (80% mancozeb)

METHODS: Tomatoes were transplanted on May 4 in two twin row plots spaced 1.65m apart. Plots were 8m in length, replicated 4 times in a randomized complete block design. Spray applications were made with a back pack airblast sprayer at 240 L/ha of water spraying only one twin row leaving the other exposed to natural infection. Fungicides were applied based on TOM-CAST on June 28, July 8, 14, 26, Aug. 9 and 16. Foliar disease assessments were made on Aug. 10 and 21. Plots were harvested Aug. 25.

RESULTS: As presented in the tables below

CONCLUSIONS: Under severe Early blight and Septoria leaf spot pressures, all of the candidate fungicides provided significant fungal disease control compared to the non-sprayed check. This was also reflective in an average 45% increase in tomato yields. The most consistant product showing the highest numerical foliar disease ratings and yield was BRAVO 500.

RESULTS:

Treatments	Rate prod/ha	Foliar Disease Ratings (0-10)1/ Aug. 10	Aug. 16	Aug. 21	Yield T/ha Aug. 26
BRAVO 500	2.8 L	9.0a*	8.5a	7.6a	63.53a
FOLPAN 50W	2.5 kg	8.5ab	8.1a	7.5a	56.21a
CAPTAN 75WG	4.0 kg	8.0b	8.0a	6.8a	58.45a
MANZATE 75DG	3.2 kg	8.5ab	7.5a	7.4a	58.48a
DITHANE 75DG	3.2 kg	8.5ab	8.0a	7.1a	52.88a
DITHANE 75DG +	3.2 kg				
RHC-387	100.0 ml	8.9ab	7.3a	6.5b	54.95a
**DITHANE 75DG +	3.2 kg				
RHC-387;	100.0 ml				
BRAVO 500	2.8 L	8.9ab	7.5a	7.0ab	57.65a
DITHANE M-45 (80WP)	3.25 kg	9.0a	7.9a	7.0ab	51.67a
DITHANE M-45 (80WP)	3.25 kg				
+ RHC-387	100.0 ml	9.0a	7.5a	7.0ab	54.67a
Control		5.5c	3.3b	3.0c	38.45b

*Means followed by the same letter are not significantly different (P<0.05 Duncan's multiple range test)

**Treatment 7 - DITHANE 75DG + RHC-378 was applied for the first 3 applications, then followed by BRAVO 500 until the end of the season.

1/ Foliar Disease Ratings (0-10) - 0, no control, foliage severely damaged; 10, complete control

ICAR IDENTIFICATION NUMBER: 61002036

CROP: Field Tomatoes, cv. Heinz 9478

PEST: Bacterial Canker, C. michiganensis subsp. michiganensis (Smith) Davis et al., Early Blight, Altemaria solani (Ell. & Mart.)L.R.Jones & Grout, Septoria Leaf Spot, Septoria lycopersici Speg.

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TITLE: BACTERIAL DISEASE CONTROL IN FIELD TOMATOES I

MATERIALS: BRAVO 500 (chlorothalonil), DITHANE 75DF (mancozeb), BRAVO C/M (27% chlorothalonil + 27% copper + 5.4% maneb), BRAVO 825 (chlorothalonil), MANZATE 75DF (mancozeb), DACOBRE DG (27% chlorothalonil + 27% copper)

METHODS: Tomatoes were transplanted on May 14 in two, twin row plots spaced 1.65m apart in Ridgetown. Plots were 8m in length, replicated 4 times in a randomized complete block design. Spray applications were made with a back pack airblast sprayer at 240 L/ha of water spraying only one twin row leaving the other exposed to natural infecticn. Fungicides were applied on a 10 day spray schedule on June 30, July 9, 19, 29, Aug. 9 and 19. Foliar disease assessments were made by counting areas of bacterial canker foliar blighting separate from counting areas of fungal disease blighting on July 28. Foliar visual ratings on a whole plot basis regardless of type of disease, bacterial or fungal were assessed on Aug. 10 and 21. Yields were taken on Aug. 31.

RESULTS: As presented in the tables below

CONCLUSIONS: Under moderate Bacterial Canker pressures neither of the two products containing copper, BRAVO C/M nor DACOBRE DF had any significant benefits in controlling foliar bacterial disease symptoms. Fungal diseases were effectively controlled by all of the materials tested in this trial. It was however interesting to note the reduction in the numbers of bacterial disease areas in the BRAVO C/M and DACOBRE DG treated plots, although the values were not statistically significant over the other treatments. All of the fungicide/bactericide treatments significantly increased total yields by approximately 57%.

RESULTS:

Treatments	Rate prod/ha	# of Disease Areas1/ Fungal July 28	Bacterial July 28	Foliar Disease Ratings (0-10)2/ Aug. 10	Aug. 21	Yield Tlha Aug. 31
BRAVO 500	2.8 L	3.8b*	10.3a	9.0a	7.6abc	52.5ab
BRAVO 825	1.8 kg	4.5b	10.0a	8.9a	7.4abc	55.9ab
DITHAME 75DF	3.2 kg	5.0b	6.0a	8.9a	7.0bc	59.4a
MANZATE 75DF	3.2 kg	5.3b	9.3a	8.5a	6.8c	60.7a
BRAVO C/M	4.5 kg	2.5b	4.8a	9.0a	8.0ab	60.4a
BRAVO C/M	6.7 kg	4.0b	2.8a	9.3a	8.0ab	69.0a
DACOBRE DG	4.0 L	1.5b	2.0a	9.0a	8.0ab	63.8a
DACOBRE DG	5.7 L	3.3b	2.8a	9.0a	8.1a	59.2a
Control		23.3a	5.3a	4.5b	3.0d	40.5b

*Means followed by the same letter are not significantly different (P<0.05 Duncan's multiple range test)

1/ # of Disease Areas - the average number of disease cluster points per plot. The lower the number the more effective the treatment.

2/ Foliar Disease Ratings (0-10) - 0, no control, foliage severely damaged; 10, complete control

ICAR IDENTIFICATION NUMBER: 61002036

CROP: Field Tomatoes, cv. Heinz 9478

PEST: Bacterial Canker, C. michiganensis subsp. michiganensis (Smith) Davis et al., Early Blight, Alternaria solani (Ell. & Mart.) L.R. Jones & Grout, Septoria Leaf Spot, Septoria lycopersici Speg.

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TITLE: BACTERIAL DISEASE CONTROL IN TOMATOES USING KOCIDE FORMULATIONS AND COMBINATIONS I

MATERIALS: KOCIDE 50WP, 40DF (copper), DITHANE 75DF, MANZATE 75DF (mancozeb)

METHODS: Tomatoes were transplanted on May 14 in single, twin row plots spaced 1.65m apart in Ridgetown. Plots were 8m in length, replicated 4 times in a randomized complete block design. Spray applications were made with a back pack airblast sprayer at 240 L/ha of water. Fungicides were applied on a 10 day spray schedule on June 30, July 9, 19, 29, Aug. 9 and 19. Foliar disease assessments were made by counting areas of bacterial and fungal foliar blighting on July 28. Foliar visual ratings on a whole plot basis were assessed on Aug. 10, 16 and 21. Yields were taken on Aug. 30.

RESULTS: As presented in the tables below

CONCLUSIONS: Improved foliar disease control was observed when the mancozeb products were added to either KOCIDE formulation. This resulted in overall higher foliar disease ratings and numerical yields. KOCIDE 40DF showed a consistant reduction in foliar disease, although not always statistically significant when compared to KOCIDE 50WP. A trend was noticed that MANZATE 75DF improved disease control when mixed with KOCIDE 50WP while MANZATE 75DF was less effective when mixed with KOCIDE 40DF. The reciprocal comment could also be made that DITHANE 75DF worked better with KOCIDE 40DF than it did with KOCIDE 50WP. Tomato yields were increased on average by 33% with chemical treatments.

RESULTS:

Treatments	Rate kg ai/ha	# of Disease Areas1/ July 28	Foliar Disease Ratings (0-10)2/ Aug. 10	Aug. 16	Aug. 21	Yield T/ha Aug. 30
KOCIDE 50WP	1.125	19.5ab*	6.9d	5.6c	5.3c	45.75a
KOCIDE 40DF	0.90	11.8bc	7.6c	6.3bc	5.6bc	46.15a
KOCIDE 50WP + DITHANE 75DF	1.125 2.25	8.0bc	8.0bc	7.1ab	6.5ab	46.20a
KOCIDE 50WP + MANZATE 75DF	1.125 2.25	10.5bc	8.5ab	7.5a	7.1a	50.35a
KOCIDE 40DF + DITHANE 75DF	1.125 2.45	5.0c	8.9a	7.4a	7.0a	50.38a
KOCIDE 40DF + MANZATE 75DF	1.125 2.25	18.0ab	8.3b	7.3a	6.4ab	50.70a
Control		26.8a	4.8e	2.5d	2.0d	36.70b

*Means followed by the same letter are not significantly different ($P<0.05$ Duncan's multiple range test)

1/ # of disease Areas - the average number of diseases, fungal and bacterial per plot. The lower the number the more effective the treatment.

2/ Foliar Disease Ratings (0-10) - 0, no control, foliage severely damaged; 10, complete control

ICAR IDENTIFICATION NUMBER: 61002036

CROP: Field Tomatoes, cv. Heinz 9478

PEST: Bacterial Canker, C. michiganensis subsp. michiganensis (Smith) Davis et al, Early Blight, Alternaria solani (Ell. & Mart.) L.R. Jones & Grout, Septoria Leaf Spot, Septoria lycopersici Speg.

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TITLE: TIMING OF BACTERIAL CONTROL MATERIALS IN TOMATOES I.

MATERIALS: BRAVO 825 (chlorothalonil), DITHANE 75DG (mancozeb), KOCIDE 40DG (copper)

METHODS: Tomatoes were transplanted on May 14 in single, twin row plots spaced 1.65m apart. Plots were 8m in length, replicated 4 times in a randomized complete block design. Spray applications were made with a back pack airblast sprayer at 240 L/ha of water. Fungicides were applied on a 10 day spray schedule on June 15, 28, July 6, 19, 26, Aug. 5 and 15. Foliar disease assessments were made by first counting areas of bacterial canker foliar blighting separate from counting areas of fungal disease blighting on July 28. Foliar visual ratings on a whole plot basis regardless of type of disease, bacterial or fungal were assessed on Aug. 10 and 21. Yields were taken on Aug. 30.

RESULTS: As presented in the tables below

CONCLUSIONS: Under relatively high bacterial canker and foliar fungal disease pressures the early application of the bactericide combination KOCIDE 40DF + DITHANE 75DG had no additional significant improvement in either fungal or bacterial disease control than using a straight fungicide program throughout the season. Although not statistically significant, it appears that yields were increased numerically at least when the early bactericidal treatments were combined with subsequent applications of BRAVO 825.

RESULTS:

Treatments3/	Rate kg prod/ha	# of Disease Areas1/ Fungal July 28	Bacterial July 28	Foliar Disease Ratings (0-10)2/ Aug. 10	Aug. 21	T/ha Aug. 30
BRAVO 825	1.8	0.8b*	11.8a	8.1a	6.0ab	50.15a
DITHANE 75DG	3.2	8.3b	5.0ab	8.1a	5.8b	53.61a
KOCIDE 40DF + DITHANE 75DG	2.25 2.25	3.8b	6.3ab	8.3a	6.0ab	51.09a
KOCIDE 40DF + DITHANE 75DG; BRAVO 825	2.25 2.25 1.8	7.8b	3.0b	8.4a	6.6a	57.68a
KOCIDE 40DF + DITHANE 75DG; BRAVO 825	2.25 2.25 1.8	6.3b	2.5b	8.5a	6.5ab	57.32a
Control		21.5a	7.8ab	6.3b	3.0c	36.06b

*Means followed by the same letter are not significantly different ($P<0.05$ Duncan's multiple range test)

1/ # of Disease Areas - the average number of disease cluster points per plot. The lower the number the more effective the treatment.

2/ Foliar Disease Ratings (0-10) - 0, no control, foliage severely damaged; 10, complete control

3/ Treatments: initial sprays were applied on June 15, and repeated every 10 days. BRAVO 825 was applied after Aug. 1 and July 6 in treatments 4 and 5, respectively.

ICAR IDENTIFICATION NUMBER: 61002036

CROP: Field Tomatoes, cv. CC164

PEST: Bacterial Canker, C. michiganensis subsp. michiganensis (Smith) Davis et al., Early Blight, Alternaria solani (Ell. & Mart.) L.R. Jones & Grout, Septoria Leaf Spot, Septoria lycopersici Speg.

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TITLE: BACTERIAL DISEASE CONTROL IN FIELD TOMATOES II

MATERIALS: BRAVO C/M (27% chlorothalonil + 27% copper + 5.4% maneb), BRAVO 825, BRAVO 500 (chlorothalonil), MANZATE 75DF, DITHANE 75DF (mancozeb), DACOBRE DG (27% chlorothalonil + 27% copper), BL-1104 (experimental bactericide)

METHODS: Tomatoes were transplanted on May 7 in two row plots spaced 1.65m apart in a grower's field near Dresden. Plots were 8m in length, replicated 4 times in a randomized complete block design. Spray applications were made with a back pack airblast sprayer at 240 L/ha of water. Fungicides/bactericides were applied on a 10 day spray schedule on June 30, July 9, 19, 29 and Aug. 9. Foliar disease assessments were made by counting areas of foliar blighting caused by bacterial canker on July 16 and 24. Foliar visual ratings on a whole plot basis regardless of type of disease, bacterial or fungal were assessed on July 30 and Aug. 9. Yields were taken on Aug. 13.

RESULTS: As presented in the tables below

CONCLUSIONS: Delaying the bactericide control materials until June 30, under this year's moderate to high Bacterial Canker disease pressures, resulted in the lack of significant bacterial control with any of these candidate materials with the exception of the higher rate of DACOBRE DG early in the season. Foliar disease ratings including both fungal and bacterial, were significantly controlled by all but the BL-1104 experimental bactericide material. BL-1104 was neither effective for the control of either tomato bacterial nor fungal diseases. The highest level of foliar disease control was achieved using the higher rates of BRAVO C/M and DACOBRE DG. The highest yield was achieved with the 5.7 L pr/ha rate of DACOBRE DG.

The initial spray timing of these materials was 10 days later than what TOM-CAST would have recommended for the geographical area - June 21. Bacterial control was not achieved whereas fungal diseases were more effectively controlled.

RESULTS:

Treatments	Rate prod/ha	# of Bacterial Disease Areas1/ July 16	July 124	Foliar Disease Ratings (0-10)2/ July 30	Aug. 9	Yield T/ha Aug. 13
BRAVO 500	2.8 L	13.6ab*	21.8a	6.1bc	6.0cd	39.45bcd
BRAVO 825	1.8 kg	11.8ab	27.0a	6.8abc	6.1cd	40.97bc
DITHANE 75DF	3.2 kg	15.8ab	26.1a	6.0c	6.0cd	36.88cde
MANZATE 75DF	3.2 kg	12.5ab	22.5a	5.3c	5.0d	39.15bcd
BRAVO C/M	4.5 kg	10.8ab	18.5ab	6.8abc	6.5bc	44.10abc
BRAVO C/M	6.7 kg	9.8ab	25.1a	7.9a	7.8a	44.97ab
DACOBRE DG	4.0 L	10.6ab	19.9ab	6.5abc	6.1cd	40.83bc
DACOBRE DG	5.7 L	8.3b	20.3ab	7.8ab	7.4ab	50.50a
BL-1104	4.0%	17.3a	19.3ab	3.0d	1.0e	32.58de
Control		16.3a	12.0b	3.3d	1.5e	30.23e

* Means followed by the same letter are not significantly different ($P<0.05$ Duncan's multiple range test)

1/ # of Bacterial Disease Areas - the average number of disease cluster points per plot. The lower the number the more effective the treatment.

2/ Foliar Disease Ratings (0-10) - 0, no control, foliage severely damaged; 10, complete control

ICAR IDENTIFICATION NUMBER: 61002036

CROP: Field Tomatoes, cv. CC164

PEST: Bacterial Canker, C. michiganensis subsp. michiganensis (Smith) Davis et al., Early Blight, Alternaria solani (Ell. & Mart.) L.R. Jones & Grout, Septoria Leaf Spot, Septoria lycopersici Speg.

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TITLE: TIMING OF BACTERIAL CONTROL MATERIALS IN FIELD TOMATOES II

MATERIALS: DITHANE 75DF (mancozeb), BRAVO 825 (chlorothalonil), KOCIDE 40DF (copper)

METHODS: Tomatoes were transplanted on May 7 in three row plots spaced 1.65m apart in a grower's field near Dresden. Plots were 8m in length, replicated 4 times in a randomized complete block design. Spray applications were made with a back pack airblast sprayer at 240 L/ha of water. Fungicides/Bactericides were applied on a 10 day spray schedule on June 15, 25, July 5, 15, 25, and Aug. 5. Foliar disease assessments were made by counting areas of foliar blighting caused by bacterial canker on July 16 and 24. Foliar visual ratings on a whole plot basis regardless of type of disease, bacterial or fungal were assessed on July 30 and Aug. 9. Yields were taken on Aug. 11.

RESULTS: As presented in the tables below

CONCLUSIONS: Early season control of Bacterial Canker was achieved when KOCIDE 40DF plus DITHANE 75DG were used. This combination sustained its foliar blight control whether bacterial or fungal throughout the season. BRAVO 825 and DITHANE 75DG were unable to reduce the bacterial "blighting" of the foliage, however, BRAVO 825 in particular was able to keep other blighting organisms in check giving an equal foliar disease rating later in the season, Aug. 9, equal to those compounds with greater bacterial control capacities.

Under heavy Bacterial Canker pressures, the use of an effective fungicide program was just as effective in sustaining tomato yields than the use of a more specific bactericidal spray program of KOCIDE 40DF + DITHANE 75DG. The fungicide DITHANE 75DG failed to provide adequate control under the conditions of this fungal/bacterial disease complex.

RESULTS:

Treatments31	Rate prod/ha	# of Bacterial Disease Areas1/ July 16	July 24	Foliar Disease Ratings (0-10)2/ July 30	Aug. 9	Yield T/ha Aug. 11
BRAVO 825	1.8	11.5a*	20.7a	7.5ab	8.0a	42.88ab
DITHANE 75DG	3.2	11.3a	21.2a	6.5b	6.0b	38.23bc
KOCIDE 40DF + DITHANE 75DG	2.25 2.25	3.6b	9.8ab	7.8ab	8.8a	43.63ab
KOCIDE 40DF + DITHANE 75DG; BRAVO 825	2.25 2.25	2.8b	5.9b	8.3a	8.8a	48.45ab
KOCIDE 40DF + DITHANE 75DG; BRAVO 825	2.25 2.25 1.8	2.1b	7.3b	89.5a	8.8a	53.10a
Control		11.1a	10.8ab	3.3c	2.0c	26.90c

*Means followed by the same letter are not significantly different (P<0.05 Duncan's multiple range test)

1/ # of Bacterial Disease Areas - the average number of disease cluster points per plot. the lower the number the more effective the treatment.

2/ Foliar Disease Ratings (0-10) - 0, no control, foliage severely damaged; 10, complete control

3/ Treatments: initial sprays **were** applied on June 15, and repeated every 10 days. BRAVO 825 was applied after Aug. 1 and July 6 in treatments 4 and 5, respectively.

ICAR IDENTIFICATION NUMBER: 61002036

CROP: Field Tomatoes, cv. CC164

PEST: Bacterial Canker, C. michiganensis subsp. michiganensis (Smith) Davis et al., Early Blight, Alternaria solani (Ell. & Mart.) L.R. Jones & Grout, Septoria Leaf Spot, Septoria lycopersici Speg.

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TITLE: BACTERIAL DISEASE CONTROL IN TOMATOES USING KOCIDE FORMULATIONS AND COMBINATIONS II

MATERIALS: KOCIDE 50WP, 40DF (copper), DITHANE 75DF, MANZATE 75DF (mancozeb)

METHODS: Tomatoes were transplanted on May 7 in three row plots spaced 1.65m apart in a grower's field near Dresden. Plots were 8m in length, replicated 4 times in a randomized complete block design. Spray applications were made with a back pack airblast sprayer at 240 L/ha of water. Fungicides/Bactericides were applied on a 10 day spray schedule on June 30, July 9, 19, 29 and Aug. 9. Foliar disease assessments were made by counting areas of foliar blighting caused by bacterial canker on July 16 and 24. Foliar visual ratings on a whole plot basis regardless of type of disease, bacterial or fungal were assessed on July 30 and Aug. 9. Yields were taken on Aug. 11.

RESULTS: As presented in the tables below

CONCLUSIONS: KOCIDE formulations 50WP and 40DF when applied alone or in combination with mancozeb formulations did not reduce or control Bacterial Canker in field tomatoes when applied on a 10 day schedule beginning on June 30. Mancozeb formulations of DITHANE 75DF and MANZATE 75DF were needed to reduce the foliar blighting caused by fungal disease organisms. KOCIDE 50WP and KOCIDE 40DF were unable to sustain foliar disease control throughout the season.

The June 30 initial spray date was 10 days after when TOM-CAST would have recommended beginning a spray program for this growing area.

RESULTS:

Treatments	Rate prod/ha	# of Bacterial Disease Areas1/ July 16	July 24	Foliar Disease Ratings (0-10)2/ July 30	Aug. 9	Yield T/ha Aug. 11
KOCIDE 50WP	1.125	10.9a*	23.3a	5.3a	3.8b	33.8a
KOCIDE 40DF	0.90	10.5a	19.9a	5.4a	3.5b	34.5a
KOCIDE 50WP + DITHANE 75DF	1.125 2.25	9.7a	18.9a	6.3a	5.8a	39.9a
KOCIDE 50WP + MANZATE 75DF	1.125 2.25	12.3a	21.9a	6.5a	6.5a	40.6a
KOCIDE 40DF + DITHANE 75DF	1.125 2.25	14.9a	25.8a	5.5a	6.8a	38.7a
KOCIDE 40DF + MANZATE 75DF	1.125 2.25	13.1a	22.3a	5.6a	5.3a	35.4a
Control		14.8a	18.3a	3.0b	2.8b	30.4a

***Means followed by the same letter are not significantly different (P<0.05 Duncan's multiple range test)**

1/ # of Bacterial Disease Areas - the average number of disease cluster points per plot. The lower the number the more effective the treatment.

2/ Foliar Disease Ratings (0-10) - 0, no control, foliage severely damaged; 10, complete control

ICAR IDENTIFICATION NUMBER: 61002036

CROP: Field Tomatoes, cv. Heinz 9478

PEST: Bacterial Canker, C. michiganensis subsp. michiganensis (Smith) Davis et al., Early Blight, Alternaria solani (Ell. & Mart.) L.R. Jones & Grout, Septoria Leaf Spot, Septoria lycopersici Speg.

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TITLE: EFFECT OF BACTERIAL CONTROL MATERIALS ON TOMATO PLUG TRANSPLANTS

MATERIALS: DITHANE 75DF (mancozeb), BRAVO C/M (27% chlorothalonil + 27% copper + 5.4% maneb), DACOBRE DG (27% chlorothalonil + 27% copper), KOCIDE 40DF, NFC 50WP (copper)

METHODS: Treatments were applied twice, 15 and 10 days prior to field transplanting. Tomatoes were transplanted on May 6 in single, twin row plots spaced 1.65m apart. Plots were 8m in length, replicated 3 times in a randomized complete block design. Plots were all sprayed with BRAVO 500 at 2.8L products per ha using a back pack airblast sprayer at 240 L/ha of water. BRAVO 500 was applied on a 10 day spray schedule on June 15, 29, July 8, 19, 29 and Aug. 9. Foliar disease assessments were made by first coutning areas of bacterial canker foliar blighting separate from counting areas of fungal disease blighting on July 28. Foliar visual ratings on a whole plot basis regardless of type of disease, bacterial or fungal were assessed on Aug. 10 and 21. Yields were taken on Aug. 26.

RESULTS: As presented in the tables below

CONCLUSIONS: A fungicide/bactericide program in the greenhouse prior to transplanting tomatoes in the field did not appear to provide any significant improvement in the disease control once plants were in the field. The control plot, in this trial, was not protected with the blanket BRAVO 500 application that was applied to all the other treatments in the field. This provided an indication of the disease pressures in this trial. The Bacterial Canker pressures were moderate, however, the foliar fungal diseases were severe.

The early greenhouse treatments had no influence in tomato yields.

RESULTS:

Treatments	Rate prod/ha	Application/ Tray	# of Disease Areas1/ Fungal July 28	Bacterial July 28	Foliar Disease Ratings (0-10)2/ Aug. 10	Aug. 21
BRAVO C/M	4.5 kg	0.059 g	4.0bc*	2.5a	9.0a	8.3ab
BRAVO C/M	6.7 kg	0.087 g	7.3b	1.8a	9.0a	8.3ab
DACOBRE DG	4.0 L	0.052 ml	4.5bc	3.8a	8.9a	8.1ab
DACOBRE DG	5.7 L	0.074 ml	1.8c	3.3a	9.0a	9.0a
KOCIDE 40DF + DITHANE 75DF	2.8 kg 2.8 kg	0.030 g 0.036 g	3.8bc	1.0a	8.9a	7.8b
KOCIDE 40DF + MANZATE 75DF	2.3 kg 2.8 kg	0.030 g 0.036 g	2.8bc	1.0a	9.0a	7.5b
NFC 50WP + DITHANE 75DF	2.25 kg 2.8 kg	0.029 g 0.036 g	3.3bc	0.5a	9.0a	7.5b
Control			12.5a	2.8a	7.1b	3.3c

* Means followed by the same letter are not significantly different ($P<0.05$ Duncan's multiple range test)

1/ # of Disease Areas - the average number of disease cluster points per plot. The lower the number, the more effective the treatment.

2/ Foliar Disease Ratings (0-10) - 0, no control, foliage severely damaged; 10, complete control

PROCESSING TOMATO MANAGEMENT RESEARCH 1993

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1. Nitrogen fertilizer trials

Response of tomato cultivars to nitrogen fertilizer was evaluated at four locations in 1993. Trials were conducted on a Granby sandy loam (HRS), a Clyde loam (Bradley), and a Brookston silt loam (Smythe). Six rates of nitrogen, ranging from 0 to 225 kg/ha of actual N were broadcast prior to planting. Ammonium Nitrate was the N source.

NITROGEN RATE (kg/ha)	YIELD (tons/acre) HRS (HY 9478)	BRADLEY (CC164)	BRADLEY (7983)	SMYTHE (Peto 696)
0	22.5	35.9	40.0	25.3
45	28.6	44.6	47.7	33.3
90	28.7	48.7	54.2	41.5
135	32.6	57.2	48.6	44.1
180	35.0	47.9	53.8	43.6
225	39.6	51.2	50.5	38.9
lsd .05	5.4	7.2	9.2	6.7

Response of the tomato crop to nitrogen fertilizer depended on soil type. On the sandy loam soil (HRS), yield increased up to 225 kg/ha of N, while on the heavier soils optimum yields were achieved at the 90 to 135 kg/ha rate.

2. 406 Plug transplant trial

Field performance of tomato transplants grown in 406 or 288 plug trays was evaluated. Within each plug size, seedings were scheduled to produce 5 and 7 week old transplants. Four fertility programs were used during transplant production. The fertilizer solutions were applied five times per week. Field plantings were made on May 11 and June 1, to evaluate stand establishment under different field conditions.

			EARLY PLANTING		LATE PLANTING	
PLUG SIZE	PLANT AGE	FERTILITY (ppm N-P-K)	PLANT STAND (%)	YIELD tons/ acre	PLANT STAND (%)	YIELD tons/ acre
406	5 week	100-47-216	83	23.3	99	22.3
		100-4-30	88	22.5	95	20.4
		100-0-83	88	25.0	96	20.7
		100-17-83	89	26.3	95	23.4
406	7 week	100-47-216	89	23.8	98	21.5
		100-4-30	88	25.7	97	23.9
		100-0-83	83	21.1	98	22.7
		100-17-83	92	20.5	99	25.7
288	5 week	100-47-216	90	27.5	99	23.4
		100-4-30	92	29.5	98	22.4
		100-0-83	94	25.0	96	17.2
		100-17-83	93	24.0	99	21.5
288	7 week	100-47-216	95	26.2	96	24.9
		100-4-30	95	27.0	95	27.4
		100-0-83	94	26.4	96	21.4
		100-17-83	92	26.6	95	24.8

In this year's trial, the later planting produced lower yields because of a longer period of drought stress. The 288 transplants had better survival, and higher yields in the early planting. Yields and plant stands were similar between the plug sizes in the late planting. Yields were similar between the four greenhouse fertility programs.

3. Conservation Tillage of Processing Tomatoes

a) Influence of Rye Height at Burndown

This trial was conducted to determine if tomatoes planted in a conservation tillage system could yield as well as those grown in a conventional tillage system. Tomatoes were planted on fall-made beds which were worked with a power bedder (Conventional till), and on beds with rye cover crops which were killed at 4 different stages. The rye cover crop was sprayed with Roundup at 0.75 l/acre when it reached 10, 15, or 30 cm height. In half of each treatment, the bed top was worked with a no-till coulter prior to planting, and the other half was planted without tillage.

TREATMENT	CROP RESIDUE (%)	PLANT STAND (%)	YIELD no coulter	YIELD coulter
Conventional Till (power bed)	9	90	30.6	34.7
Spray @ 10 cm (April 13)	22	92	29.5	31.1
Spray @ 15 cm (April 23)	32	91	30.0	33.3
Spray @ 30 cm (April 28)	63	96	29.7	30.9
Center sprayed @ 15 cm; outside @ 45 cm	52	92	31.4	30.8

The conservation tillage practices resulted in more crop residue on the soil surface, which would be beneficial for soil conservation and wind abatement. Transplant establishment was not reduced by the conservation tillage practices. Conventional tillage produced the highest yields.
Within each treatment, the coulter tillage improved yield, indicating that reduced soil aeration may be responsible for the yield suppression with conservation tillage.

4. Conservation Tillase of Processins Tomatoes

b) Nitrogen Application in cons. till.

Nitrogen fertilizer application methods were evaluated for tomatoes grown in a conservation tillage system. A rye cover crop was planted on fall-made beds on a sandy loam soil. In the spring, the rye was burned down with Roundup, when it reached 15 cm tall. After the rye died down, the bed top was worked with a no-till coulter implement to loosen the soil and leave the rye residue on the surface. Nitrogen was applied at 165 kg/ha, either as a pre-plant broadcast (incorporated with the coulter tillage), or banded (2 bands per row, 10 cm from rows).

TREATMENT	YIELD (tons/acre)
165 N broadcast	42.9
165 N band	41.7
0 N check	25.5
LSD .05	3.0

Tomato yield was similar between broadcast and banded applications. There was no advantage to banding nitrogen in a conservation tillage system.

5. Plant Populations for HY 9909 and HY 9802

Trials were conducted to determine the optimum plant population for two new tomato hybrids, HY 9909 and HY 9802. Both cultivars were planted on twin rows on fall-made beds on a sandy loam soil. The twin rows were spaced 40 cm (16") apart. In-row spacings of 12", 1 5 and 18" were used to obtain plant populations of 17,400, 14,000, or 11,660 plants/acre.

9802 (plants/acre)	YIELD (ton/acre)	9909 (plants/acre)	YIELD (ton/acre)
17,400	30.45	17,400	30.67
14,000	31.14	14,000	29.12
11,660	30.95	11,660	29.48

There were no significant yield differences between the three spacings. The standard plant population of 11,660 plants per acre is recommended for both 9909 and 9802.