Observations of Psylla Resistance Among Several Pear Cultivars and Species

H. A. QUAMME[1]

Pear psylla, *Psylla pyricola* Forester is a serious pest of pear trees. Psylla weaken the pear tree through feeding and discolor the fruit by producing honeydew exudate on which sooty mold grows. Severe tree losses can also occur from pear decline which is transmitted by psylla.

Westigard, et al. (3), found psylla resistance was present in a wide number of species and suggested that resistant cultivars could be bred. Psylla resistance has been transmitted from *Pyrus ussuriensis* to its progenies with *P. communis* (1).

In 1980, an outbreak of pear psylla occurred in the pear orchards at the Research Station, Harrow, Ontario, despite the use of insecticides. A differential response in infestation was observed among pear cultivars and species which is reported here. During mid-September, observations were made on 46 cultivars topworked on 1 to 8 trees each of Old Home which were planted at a 4.6 x 5.5 m spacing. This collection was not arranged in a manner suitable for analysis of variance. Observations were also made on a 4 year-old pear orchard arranged as 4 replicates of 2 tree plots planted at a 1.5 x 3.5 m spacing.

The cultivars were rated for symptoms of psylla injury and the number of nymphs and eggs on a sample of 15 mature leaves were counted. The leaf area was measured with a leaf area meter (Lamba Instruments, Inc.) and the number of nymphs and eggs expressed on a unit area basis.

Ten cultivars out of the 46 in main cuitivar collection, including *P. bretschneideri* W6, *P. calleranya* CP6-6, Harbin, Philip, *P. fauriei* W1, *P. ussuriensis* Swanni Tait-Dropmore, Ure, *P. pyrifolia* W6, and Honeysweet, had low levels of infestation (13 nymphs/dm² leaf or less and no eggs) and no apparent symptoms of psylla injury (Table 1). *P. fauriei* 4B, Sierra, and

Table 1. Natural psylla infestation levels and feeding damage in the Harrow pear collection.

Species	Cultivar	Average no. of psylla per dm² of leaf				Psylla injury[1]
		Nymphs		Eggs		
		Mean	S.E.	Mean	S.E.	
P. bretschneideri	W6	0		0		0
P. calleryana	CP6-6	0		0		0
P. fauriei	W1	2	0.9	0		0
	4B	29	6.9	0		0
		7.8		0		0
P. ussuriensis	Harbin	1	0.4	0		0
	Swanni	3	1.0	0		0
	76	25	9.2	1	0.2	1
		9.7		0.3		0.3

[1]Agriculture Canada, Research Station, Summerland, British Columbia V0H 1Z0.

Table 1. (Continued).

Species	Cultivar	Average no. of psylla per dm² of leaf: Nymphs Mean	Nymphs S.F.	Eggs Mean	Eggs S.F.	Psylla injury[1]
P. ussuriensis X *P. communis* hybrids	Philip	2	0.8	0		0
	Tait Dropmore	5	2.2	0		0
	Ure	6	4.0	0		0
	Olia	35	9.2	12	6.4	1
	Golden Spice	68	29.0	4	2.3	0
		23.2		3.2		0.2
P. pyrifolia	W6	11	3.3	0		0
P. pyrifolia X *P. communis* hybrids	Mac	59	11.8	5	2.3	2
	NJ5	65	9.1	4	0.3	2
	Kieffer	71	11.6	14	6.7	2
		51.5		5.8		1.5
P. communis	Honeysweet	13	3.8	0		0
	Enie	22	5.0	1	0.9	1
	Barseck	25	7.0	0		2
	Seckel	33	12.1	1	0.6	1
	Sierra	34	10.2	1	0.9	0
	Harvest Queen	35	8.0	8	0.3	2
	Gaspard No. 5	42	14.0	14	9.3	2
	Flemish Beauty	44	18.6	2	2.0	1
	Surecrop	44	8.4	3	1.7	2
	Maxine	52	15.2	7	1.9	1
	Bosc	58	8.4	5	3.9	2
	Miney	63	26.0	30	12.9	2
	Anjou	65	13.8	5	5.2	2
	Magness	76	16.5	0		1
	Pierre Corneille	80	17.9	10	4.3	2
	Old Home	83	15.8	44	11.8	2
	Aurora	84	20.5	7	3.9	2
	Highland	86	13.1	9	4.0	2
	NY 8760	95	10.7	4	1.5	2
	Laxton's Progress	101	17.2	2	3.8	1
	Moe	102	21.6	14	7.1	1
	Merton Pride	108	26.1	42	21.4	2
	Harrow Delight	113	14.1	3	1.3	2
	Ewart	114	24.1	14	4.3	2
	Bartlett	117	27.3	5	1.3	2
	Moonglow	121	17.0	1	0.7	2
	Clapp's Favorite	137	30.2	2	1.0	2
	Dumont	137	30.2	22	7.6	2
	Sheldon	138	14.1	13	42.0	2
	Gifford	150	17.8	10	9.3	2
		79.1		9.3		1.6

[1]Injury observed after feeding was scored: 0 = no apparent injury; 1 = exudation of honey dew and presence of sooty blotch; 2 = leaf drop.

Table 2. Natural infestation of pear psylla on several pear cultivars in a 4-year-old orchard at Harrow.

Cultivar	Species[1]	Average no. of psylla per dm² of leaf[2]	
		Nymphs	Eggs
Harbin	U	3 a	0 a
P. pyrifolia 'W6'	P	6 a	2 a
P. bretschneideri 'W6'		8 a	0 a
John	UXC	9 a	0 a
P. pashia '#1'		10 a	0 a
Ure	(UXC) XC	10 a	0 a
Tait-Dropmore	UXC	12 a	0 a
P. fauriei '4B'		17 a	0 a
Bosc	C	75 b	17 abc
Moe	C	78 b	1 a
Kieffer	PXC	97 bc	6 ab
Twentieth Century	P	126 bc	36 c
Bartlett	C	142 cd	10 abc
Anjou	C	150 cd	41 c
Old Home	C	189 d	16 abc

[1]C = *P. communis*, P = *P. pyrifolia* and U = *P. ussuriensis*.
[2]Mean separation within columns by Duncan's multiple range test, 5% level.

Golden Spice supported higher levels of psylla infestation, but also exhibited no injury. The 33 other clones were highly infested and exhibited moderate to severe injury.

Six of the most resistant cultivars in the main orchard including Harbin, *P. bretschneideri* W6, Ure, Tait-Dropmore and *P. fauriei* 4B were also among the most resistant in the replicated test (Table 2). These six cultivars and 2 others, John and *P. pashia* #1 had significantly lower psylla counts than the commercially grown cultivars, Bosc, Kieffer and Anjou. The cultivars, Moe, Twentieth Century and Old Home were highly infested with psylla in this orchard.

Almost all of the resistant clones were of the oriental species, *P. bretschneideri, P. calleranya, P. pashia, P. pyrifolia* or *P. ussuriensis*. Westigard, et al. (3), reported resistance within these species and that it involved both host preference and anibiosis.

The *P. ussuriensis* x *P. communis* hybrids, Tait-Dropmore, Philip, John and Ure, are more cold resistant than standard cultivars, Bartlett, Anjou and Bosc (2), and represent improvements in size and quality over wild selections. These hybrids could be a valuable source of both psylla resistance and cold hardiness for pear breeding programs. Further work using controlled infestation is required to determine if *P. communis* clones, such as Honeysweet and Sierra, exhibit psylla resistance or if they are chance escapes.

Literature Cited

1. Harris, Marvin K. and Robert C. Lamb. 1973. Resistance to pear psylla in pears with *Pyrus ussuriensis* lineage. J. Amer. Soc. Hort. Sci. 98:378-381.
2. Quamme, H. A. 1982. Breeding new pear cultivars for Canadian conditions. In 'The Pear,' ed. Tom van der Zwet and Norman F. Childers. Hort. Public., Gainsville, Florida.
3. Westigard, P. H., M. N. Westwood and P. B. Lombard. 1970. Host preference and resistance to *Pyrus* species to pear psylla, *Psylla pyricola* Forester. J. Amer. Soc. Hort. Sci. 95:34-36.