Bioecology of sea buckthorn fly (Rhagoletis batava obscuriosa Kol.) and pest control treatments in Altai Region

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A

B

D

C

Picture 1 – Sea buckthorn fly: A- adult insect, B –larva, penetrating into fruit, C – larva before going to pupation, D - puparia

Picture 2 – Whorls damaged by larvae

A

B

Picture 3 – Mode of damage to fruits by sea buckthorn fly: A – in the period of active feeding of larvae, B – after departure of larvae to pupation

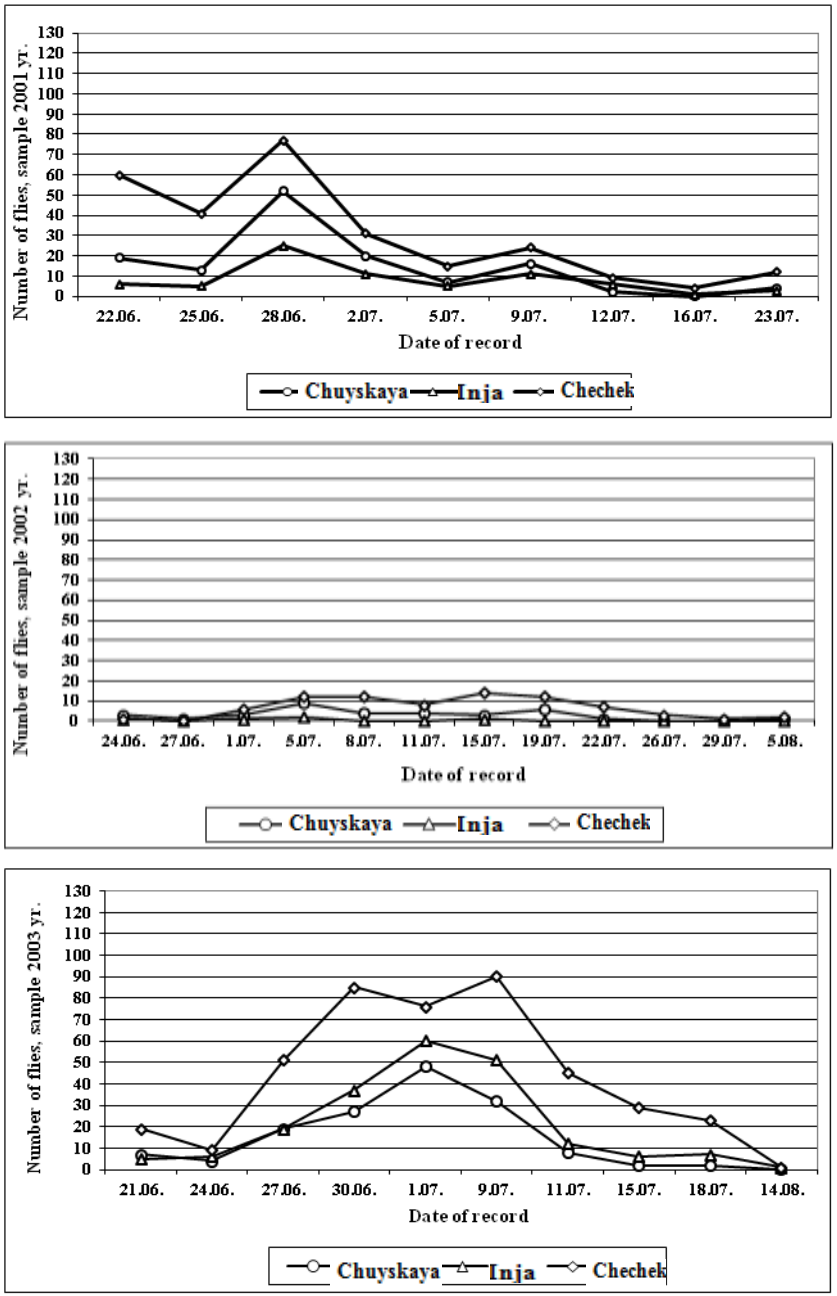
A

B

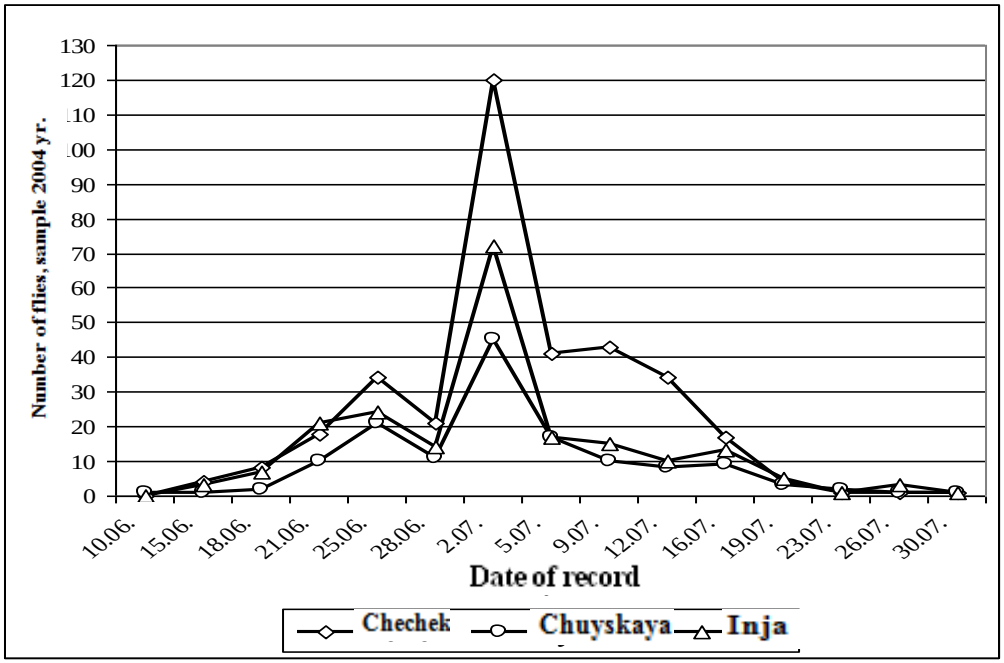
C

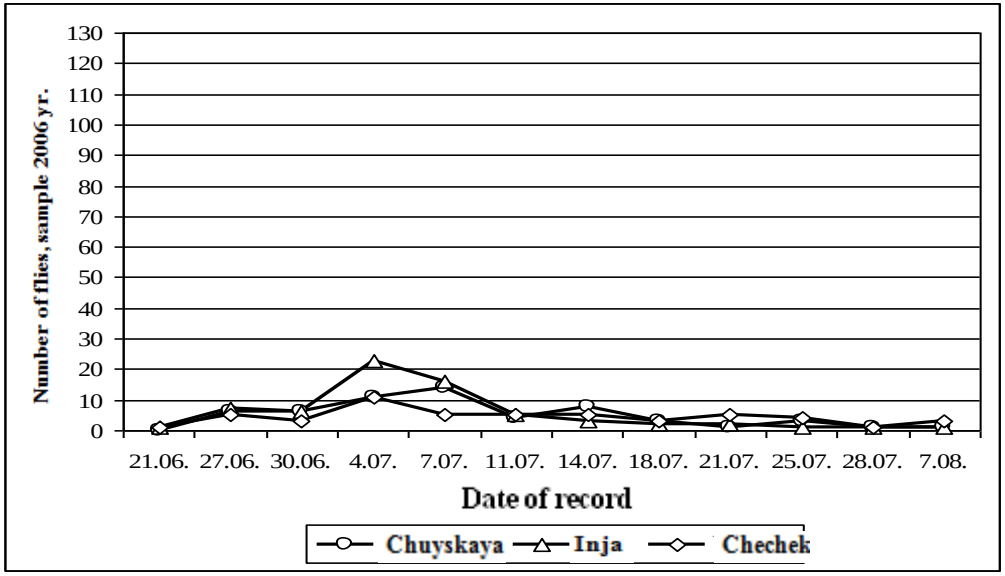
Picture 4 – Cultivar samples of sea buckthorn: A – resistant to sea buckthorn fly, B – relatively resistant red-fruited, C – relatively resistant late-ripening

Picture 5 – Yellow glue trap

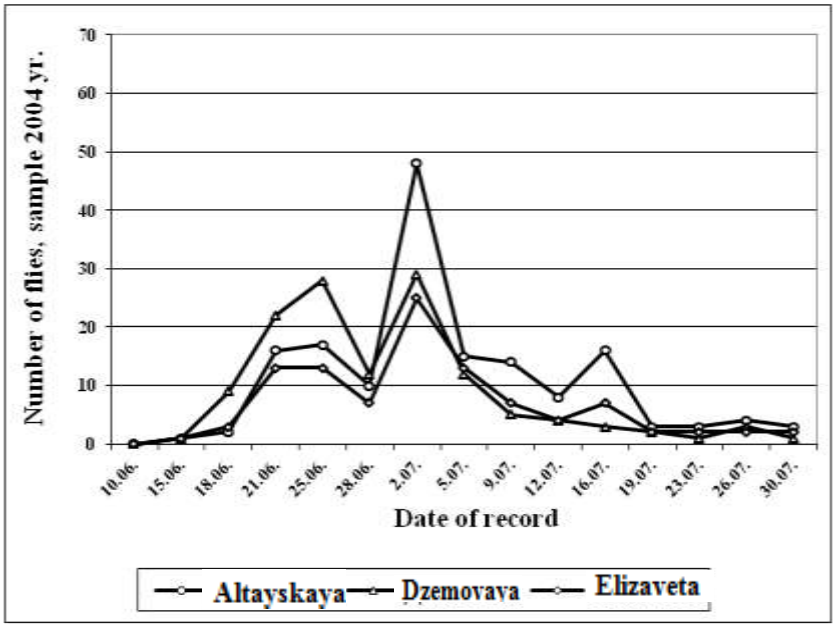


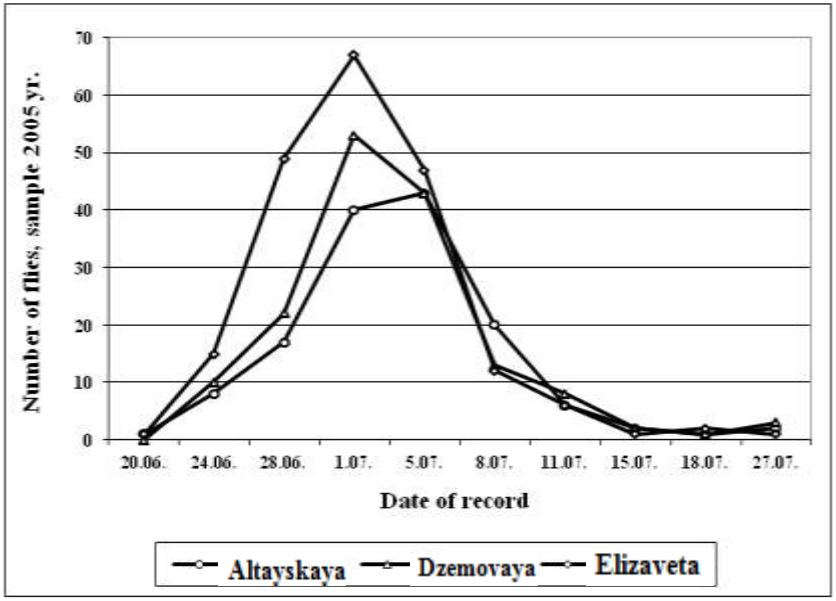
Picture 6 – Dynamics of summer for sea buckthorn fly, 2001-2003 yrs.





Picture 7 – Dynamics of summer for sea buckthorn fly, 2004 yr. and 2006 yr.





Picture 8 – Dynamics of summer for adult insects during the settlement on the new sea buckthorn plantation

Table 1 – Efficiency of Actellic (Pirimiphos-methyl) micro dose against sea buckthorn fly. Industrial experiment. Treatment 27.07.07

Variant	Variety	Loss of larvae, %
Without treatment- control	Chuyskaya Inja Zemchuznitsa	19,3 25,4 18,6
Actellic (Pirimiphos-methyl) - 1 l/ha (reference standard)	Chuyskaya	100
Actellic (Pirimiphos-methyl) - 0,1 l/ha + bioadditive	Chuyskaya Inja Zemchuznitsa	96,0 100 100
LSD_{05}	-	3,6

Table 2 – Efficiency of reduced doses of Actellic (Pirimiphos-methyl) against sea buckthorn fly. Variety Chuyskaya. Industrial experiment. Treatment 30.07.10

Variant	Loss of larvae, %		
	2-3.08.	9-10.08.	19.08.
Without treatment- control	2,4	3,0	0,1
Actellic (Pirimiphos-methyl) – 1 l/ha (reference standard)	93,0	100	100
Actellic (Pirimiphos-methyl) – 0,5 l/ha + bioadditive	85,0	97,0	100
Actellic (Pirimiphos-methyl) – 0,4 l/ha + bioadditive	82,0	95,0	100
Actellic (Pirimiphos-methyl) – 0,3 l/ha + bioadditive	70,7	82,5	96,2
Actellic (Pirimiphos-methyl) – 0,2 l/ha + bioadditive	59,2	62,0	84,8
LSD_{05}	0,98	0,86	0,84

Table 3 – Yield of sea buckthorn associated with reduced doses of Actellic (Pirimiphos-methyl) treatment. Variety Chuyskaya, 2010 yr. Industrial experiment

Variant	Yield		Addition to control	
	kg/bush	t/ha	t/ha	%
Without treatment- control	3,94	4,65	-	-
Actellic (Pirimiphos-methyl) – 1 л/га (reference standard)	9,91	11,71	7,06	151
Actellic (Pirimiphos-methyl) – 0,5 l/ha + bioadditive	9,65	11,41	6,76	138
Actellic (Pirimiphos-methyl) – 0,4 l/ha + bioadditive	9,80	11,58	6,93	149
Actellic (Pirimiphos-methyl) – 0,3 l/ha + bioadditive	8,60	10,16	5,50	118,2
Actellic (Pirimiphos-methyl) – 0,2 l/ha + bioadditive	6,50	7,68	3,03	65,1
LSD_{05}	1,63	0,06	-	-

Table 4 – Efficiency 1% EC of Phytoverm (Avermectin) against sea buckthorn fly. Variety Chuyskaya. 2009 yr. Industrial experiment

Variant	Treatment ratio	Loss of larvae, %		
		28.07	4.08	11.08
Without treatment- control	-	8,6	12,4	5,1
Actellic (Pirimiphos-methyl) – 1 l/ha (reference standard)	1	76,2	100	100
Phytoverm (Avermectin) – 3 l/ha	1	11,1	67,5	84,7
Phytoverm (Avermectin) – 3 l/ha	2	-	89,6	100
Phytoverm (Avermectin) – 1,5 l/ha + bioadditive	1	15.6	57,4	68,1
Phytoverm (Avermectin) – 1,5 l/ha + bioadditive	2	-	95,9	97,7
LSD_{05}	-	3,8	3,4	1,3

Table 5 – Yield of sea buckthorn associated with different Phytoverm (Avermectin) treatment backgrounds.
Variety Chuyskaya, 2009 yr. Industrial experiment

Variant	Treatment ratio	Yield		Increase in yield	
		kg/ bush	t/ha	t/ha	%
Without treatment- control	-	3,2	3,78	-	-
Actellic (Pirimiphos-methyl) – 1 l/ha (reference standard)	1	8,2	9,69	5,91	156
Phytoverm (Avermectin) – 3 l/ha (reference standard)	1	8,4	9,21	5,43	143
Phytoverm (Avermectin) – 3 l/ha	2	7,8	9,92	6,14	162
Phytoverm (Avermectin) - 1,5 l/ha + bioadditive	1	4,9	5,79	2,01	53
Phytoverm (Avermectin) - 1,5 l/ha + bioadditive	2	8,0	9,45	5,67	150
LSD_{05}	-	2,0	0,31	-	-

Table 6 - Yield and weight of sea buckthorn fruits associated with different treatment backgrounds.
Variety Chuyskaya. Planting 2012 yr. Mircroplot experiment.

Variants of experiment	Treatment ratio	Weight of 100 fruits, g	Yield		Addition to control, %
			kg/bush	t/ha	
Without treatment- control	-	50,1	1,5	1,8	-
Actellic (Pirimiphos-methyl) – 0,1% (reference standard)	1	51,0	3,2	3,9	116
Actellic (Pirimiphos-methyl) – 0,04% + bioadditive	1	53,1	3,6	4,5	150
Phytoverm (Avermectin) (1% EC) – 0,3%	2	51,4	2,6	3,2	77
Phytoverm (Avermectin) (1% EC) – 0,15% + bioadditive	2	54,5	3,5	4,3	138
LSD_{05}	-	0,7	0,8	0,98	-

Table 7 – Economical efficiency of sea buckthorn fruit production associated with different treatment backgrounds

Variant	Yield, t/ha	Expenses to1 ha, thous. rubles		Prime cost, thous. rubles/ha	Earnings thous. rubles/ha	Profit, thous. rubles/ha	Level of profitability, %
		total	protective treatments				
Without treatment-control	1,8	79,7	0	44,2	82,8	38,6	48,4
Actellic (Pirimiphos-methyl) - 1 l/ha (reference standard)	3,9	111,5	1,22	28,5	179,4	67,9	60,8
Actellic (Pirimiphos-methyl) - 0,4 l/ha + bioadditive	4,5	120,1	0,49	26,6	207,0	86,9	72,3
Phytoverm (Avermectin) - 6 l/ha	3,2	110,6	9,60	34,5	147,2	36,6	33,0
Phytoverm (Avermectin) - 3 l/ha + bioadditive	4,3	122,3	4,80	28,4	198,8	76,5	62,5

A B

Picture 9 – Fruits of sea buckthorn of variety Inja: A – healthy, B - defective

Table 8 – Change of weight of yield under different contents of defective fruits.
Variety Inja. 2009 yr

Indexes	Healthy fruits	Content of defective fruits in weight of yield, %										
		1	10	20	30	40	50	60	70	80	90	100
Weight of 100 fruits, g	92,7	92,5	89,5	86,7	84,0	81,8	79,8	73,5	70,3	67,1	63,9	60,5
Percent to control	-	99,7	96,5	93,5	90,6	88,2	86,0	79,2	75,8	72,3	68,9	65,2
Yield loss, %	-	0,3	3,5	6,5	9,4	11,8	14,0	20,8	24,2	27,7	31,1	34,8