

Supplementary Materials: Evolution of Asian Corn Borer Resistance to Bt Toxins used Singly or in Pairs

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Table S1. Resistance ratios (RRs) and their 95% confidence intervals (CIs) for five strains of *Ostrinia furnacalis* selected with Bt toxins singly or in pairs.

Three strains selected with a single toxin					Two strains selected with a pair of toxins									
Selected		95% CI			Selected		95% CI			Selected		95% CI		
with	Gen.	RR	Lower	Upper	with	Gen.	RR	Lower	Upper	with	Gen.	RR	Lower	Upper
Cry1Ab					Cry1Ab					Cry1Ab				
Cry1Ab	1	1.4	0.8	2.5	Cry1Ab + Cry1F	1	2.0	1.4	2.9	Cry1Ab + Cry1Ie	1	1.6	1.1	2.3
	2	1.1	0.7	1.7		2	3.7	3.0	4.5		2	1.6	1.2	2.2
	3	0.9	0.6	1.5		3	3.3	2.6	4.1		3	1.9	1.4	2.5
	4	3.9	2.4	6.4		4	3.8	2.9	5.0		4	3.0	2.4	3.8
	5	4.7	3.5	6.3		5	2.7	2.0	3.7		5	3.0	2.2	4.1
	6	5.8	4.5	7.5		6	7.8	5.8	10.6		6	7.6	5.7	10.1
	7	13.2	10.1	17.2		7	17.9	13.6	23.6		7	15.6	11.0	22.0
	8	18.5	14.9	23.0		8	17.6	13.6	22.8		8	14.7	10.7	20.2
	9	23.4	18.2	30.0		9	11.2	8.8	14.3		9	24.3	18.2	32.6
	10	23.6	17.2	31.3		10	12.5	9.0	17.4		10	29.8	21.1	42.2
	11	32.0	24.3	42.2		11	32.1	24.6	42.0		11	44.6	33.2	59.8
	12	38.8	30.8	48.9		12	35.2	27.1	45.7		12	53.8	42.2	68.7
	13	33.1	22.9	47.8		13	36.8	28.9	46.9		13	64.6	51.2	81.5
	14	28.2	22.6	35.2		14	32.5	23.4	45.1		14	60.4	46.7	78.5
Cry1F					Cry1F									
Cry1F	1	1	0.8	1.3	Cry1Ab + Cry1F	1	1.5	1.1	2					
	2	1.5	1.1	2.0		2	2.0	1.5	2.8					
	3	1.4	1.1	1.8		3	1.8	1.4	2.4					
	4	2.6	1.8	3.9		4	5.8	4.5	7.4					
	5	59.0	44.7	77.9		5	45.4	28.8	71.6					
	6	557	419	740		6	240	167	344					
	7	>600				7	>600							
	9	>1300				9	-							
	10	>1250				10	-							
	11	>1250				11	>1250							
	12	>1250				12	-							

	13	>1250		13	-					
	14	>1250		14	>1250					
		Cry1Ie					Cry1Ie			
Cry1Ie	1	0.6	0.5	0.7		Cry1Ab	1	2.6	2	3.4
	2	0.8	0.7	1.0		+Cry1Ie	2	2.7	1.9	3.9
	3	0.9	0.6	1.5			3	2.4	1.9	3
	4	3	2.3	4.0			4	10.2	7.3	14.4
	5	54.9	42.2	71.5			5	85.4	62.6	116.4
	6	111	77.3	160			6	>400		
	7	>400					7	>400		
	9	>800					9			
	10						10	>830		
	12	>1000					12			
	14	>840					14	>1100		

Cry1Ie				Cry1Ab + Cry1Ie			
0	576	1.25	(1.07–1.42)	0	480	2.45	(1.73–3.35)
1	576	1.55	(1.32–1.75)	1	480	6.27	(4.94–7.80)
2	576	1.84	(1.61–2.05)	2	480	6.56	(4.52–8.52)
3	480	2.19	(0.77–4.14)	3	384	5.78	(4.80–6.85)
4	480	7.39	(5.72–9.32)	4	576	24.9	(18.9–35.1)
5	480	133	(107–166)	5	672	207	(159–274)
6	576	270	(198–397)	6	96	> 952	(12.9%)
7	96	>952	(8.6%)	7	96	> 952	(14.1%)
9	48	>1935	(10.4%)	9			
10				10	48	>2020	(8.7%)
12	48	>2480	(0.0%)	12			
13				13	48	>2700	(4.2%)
14	96	>2047	(0.0%)	14	48	>2680	(0.0%)

*When the highest concentration tested killed <50% of larvae, the LC₅₀ is listed as > the highest concentration tested, the percentage mortality at that concentration in parentheses (adjusted for control mortality), and n is the number of larvae tested at that concentration, for example, in generation 7 for the strain selected with Cry1F, 7.5% of larvae were killed by 476 µg Cry1F per g diet, the highest concentration tested.

Table S3. LC₅₀s and their 95% fiducial limits (in µg toxin per g diet) for the unselected susceptible S strain of *Ostrinia furnacalis*.

Replicate^a	n	LC50 (95% FL)
Cry1Ab		
A	480	0.18 (0.14–0.22)
B	480	0.18 (0.14–0.22)
C	576	0.23 (0.17–0.30)
D	576	0.17 (0.14–0.21)
E	576	0.21 (0.17–0.25)
F	672	0.22 (0.14–0.30)
Pooled	3360	0.19 (0.16–0.23)
Cry1F		
A	576	0.54 (0.27–0.84)
B	480	1.00 (0.80–1.24)
C	576	1.17 (0.90–1.48)

D	576	0.60 (0.46–0.76)
E	624	0.75 (0.58–0.95)
F	672	0.74 (0.58–0.92)
Pooled	3504	0.79 (0.63–0.96)
Cry1Ie		
A	480	2.45 (1.73–3.35)
B	384	2.62 (2.22–3.06)
C	528	2.68 (2.15–3.26)
D	528	2.01 (1.60–2.47)
E	624	1.96 (1.52–2.45)
F	528	2.21 (1.74–2.77)
G	576	2.34 (1.87–2.88)
Pooled	3648	2.43 (2.07–2.79)

^a Replicates were done throughout the 14 generations of the selection experiment, roughly every other generation.