

Section II
Foliage & Seed-Feeding & Mining Insects

COLORADO POTATO BEETLE CONTROL WITH GENETICALLY
ENGINEERED (TRANSGENIC) POTATO PLANTS, 1991

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Test plots using Russet Burbank potatoes that had been genetically engineered to contain a transformed *Bacillus thuringiensis* var. *tenebrionis* (Bt) gene were established at the UI Research and Extension Center, Caldwell, ID. Two Russet Burbank check plots were machine planted on 12 April and five transgenic potato lines obtained from Monsanto, including one non-transgenic (NT) Russet Burbank line, were hand planted on 20 May. All treatment plots were replicated six times. Individual check plots were 2 rows (36 inch spacing) by 25 feet. Individual transgenic plots consisted of 2 rows (36 inch spacing) by 25 feet with each of the two rows containing five hills of each line for a total of ten hills per line in the two row plot. The transgenic potatoes planted ranged from pea to golf ball size mini-tubers. Due to the small average size, these tubers were planted at a shallow depth of not more than four inches. Irrigation of plots was by furrow. No chemical controls of Colorado potato beetles (CPB) were used other than to one of the Russet Burbank check treatments when an application of Asana (0.02 lb ai/A) was made on 25 June. On a weekly basis, all stages of beetles were counted and percent defoliation estimations were made using whole plant inspections of all plants within the two plot rows for the transgenic lines and the center five hills in each row (10 hills/plot) in the Check and Asana treated plots. Larval stages were separated into small (1-2 instar) and large (3-4 instar). Data were analyzed using ANOVA and Newman-Keuls studentized range test.

Control of CPB was maintained, with subsequent reduced amounts of defoliation, by the transgenic potatoes equal to that of the Russet Burbank check treated with Asana for the duration of the test. Variability between plots precluded statistical separation between treatments in some instances, although the untreated check and the NT line generally had higher numbers of small and large larvae and showed much more extensive defoliation. Adults on the transgenic plants appeared not to feed on the leaves. This may have been reflected in the number of egg masses laid on the various lines on 23 July and 5 August.

Treatment	7/12	7/19	7/16	7/23	7/30	8/5
Untreated Check	0.8 a	0.2 a	0.2 a	30.5 a	0.2 a	75.8 b
Check + Asana	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	4.5 a
BWE NT	0.3 a	1.7 abc	2.3 ab	28.2 a	1.5 a	58.3 b
BWE 25a	1.3 a	0.8 ab	4.0 ab	4.0 a	2.2 a	2.5 a
BWE 19c	0.8 a	2.8 abc	1.2 a	1.3 a	1.0 a	6.2 a
BWE 13d	1.7 a	4.5 c	5.3 b	7.0 a	0.7 a	3.0 a
BWE 16a	3.5 a	4.0 bc	1.3 a	6.0 a	1.3 a	5.5 a
Untreated Check	89.0 b	35.2 b	40.7 b	71.0 b	0.8 a	0.0 a
Check + Asana	0.0 a	0.0 a	0.0 a	0.0 a	0.2 a	0.0 a
BWE NT	0.0 a	5.2 a	15.2 ab	27.8 a	7.2 a	1.2 a
BWE 25a	1.3 a	4.0 a	2.7 a	1.5 a	3.2 a	0.8 a
BWE 19c	0.2 a	0.5 a	3.3 a	4.3 a	2.8 a	1.8 a
BWE 13d	6.0 a	15.7 a	15.0 ab	0.7 a	4.5 a	1.3 a
BWE 16a	0.5 a	5.5 a	14.2 a	6.7 a	5.8 a	3.8 a
Untreated Check	31.5 b	28.5 b	24.5 b	27.8 b	18.0 c	0.0 a
Check + Asana	0.0 a	0.0 a	0.0 a	0.3 a	0.0 a	0.0 a
BWE NT	0.0 a	0.0 a	0.2 a	3.2 a	15.2 bc	9.2 a
BWE 25a	0.2 a	0.2 a	0.0 a	7.2 a	2.5 ab	0.5 a
BWE 19c	0.0 a	0.3 a	0.0 a	3.7 a	4.5 ab	4.5 a
BWE 13d	0.0 a	0.8 a	2.0 a	5.3 a	3.0 ab	3.3 a
BWE 16a	0.0 a	0.0 a	2.8 a	4.8 a	3.2 ab	5.5 a
Untreated Check	4.3 b	1.5 a	9.8 b	6.8 b	4.5 ab	0.0 a
Check + Asana	0.0 a	0.0 a	0.0 a	0.3 a	0.8 a	0.0 a
BWE NT	0.0 a	0.3 a	1.0 a	1.5 a	4.7 ab	9.2 a
BWE 25a	0.2 a	0.8 a	2.5 a	1.8 a	6.2 b	0.5 a
BWE 19c	0.2 a	0.3 a	1.2 a	1.8 a	5.3 ab	4.5 a
BWE 13d	0.0 a	1.5 a	1.0 a	3.0 a	9.0 b	3.3 a
BWE 16a	0.2 a	1.3 a	1.0 a	2.5 a	7.0 b	5.5 a
Untreated Check	0.0 a	28.8 b	26.8 b	42.2 b	66.7 b	75.8 b
Check + Asana	0.0 a	2.2 a	0.8 a	0.8 a	1.2 a	4.5 a
BWE NT	0.0 a	1.7 a	18.3 b	32.5 b	48.3 b	58.3 b
BWE 25a	0.0 a	0.2 a	0.5 a	4.7 a	1.5 a	2.5 a
BWE 19c	0.0 a	0.3 a	0.5 a	3.3 a	3.8 a	6.2 a
BWE 13d	0.0 a	1.8 a	0.2 a	0.8 a	1.7 a	3.0 a
BWE 16a	0.0 a	2.0 a	0.2 a	2.0 a	3.0 a	5.5 a

Level of significance = .05