Table. Main characteristics and toxic activity of spore-crystal suspensions of selected Argentine *Bacillus thuringiensis* strains against neonate larvae of *Epinotia aporema* (Lepidoptera: Tortricidae).

| *B. thuringiensis* strain a | Source b | Crystal morphologies c | Protein size (kDa) | Profiles of insecticidal genes | Mortality  (%) d |
| --- | --- | --- | --- | --- | --- |
| INTA 3-1 | A | B and C | 130 and 65 | *cry1Aa, cry1Ab, cry1Ac, cry1Ia, cry2Aa*, *cry2Ab* and *vip3Aa* | 40.0±6.9 |
| INTA 7-3 | A | B and C | 130 and 65 | *cry1Aa, cry1Ac, cry1Ia, cry2Aa*, *cry2Ab* and *vip3Aa* | 31.9±5.0 |
| INTA L1-2 | E | B and C | 130 and 65 | *cry1Aa, cry1Ab, cry1Ac, cry1Ia, cry2Aa*, *cry2Ab* and *vip3Aa* | 11.4±2.4 |
| INTA L2-1 | E | B and C | 130 and 65 | *cry1Aa, cry1Ab, cry1Ac, cry1Ia, cry2Aa*, *cry2Ab* and *vip3Aa* | 28.2±0.8 |
| INTA Ep-2 | E | B and C | 130 and 65 | *cry1Aa, cry1Ab, cry1Ac, cry1Ia, cry2Aa*, *cry2Ab* and *vip3Aa* | 13.9±2.4 |
| INTA VO3 | E | B and C | 130 and 65 | *cry1Aa, cry1Ac, cry1Ia, cry2Aa*, *cry2Ab* and *vip3Aa* | 20.0±2.3 |
| INTA L14-2 | E | B and C | 130 and 65 | *cry1Aa, cry1Ab, cry1Ac, cry1Ia, cry2Aa*, *cry2Ab* and *vip3Aa* | 31.4±2.1 |
| INTA L93-3 | E | B and C | 130 and 65 | *cry1Aa, cry1Ab, cry1Ac, cry1Ia, cry2Aa*, *cry2Ab* and *vip3Aa* | 23.6±4.8 |
| INTA Fr8-1 | A | O | 130 | *cry8* | 2.8±2.4 |
| INTA 50-4 | A | B and C | 130 and 65 | *cry1Aa, cry1Ac, cry1Ia, cry2Aa*, *cry2Ab* and *vip3Aa* | 11.6±4.4 |
| INTA 54-8 | A | B and C | 130 and 65 | *cry1Aa, cry1Ac, cry1Ia, cry2Aa*, *cry2Ab* and *vip3Aa* | 27.2±2.9 |
| INTA 56-4 | A | B and C | 130 and 65 | *cry1Aa, cry1Ac, cry1Ia, cry2Aa* , *cry2Ab* and *vip3Aa* | 25.5±7.4 |
| INTA Mo1-7  INTA Mo1-12  INTA Mo1-10 | C | B and C  B and C  B | 130 and 65  130 and 65  130 | *cry1Aa, cry1Ab, cry1Ac, cry1Ia, cry2Aa*, *cry2Ab* and *vip3Aa*  *cry1Aa, cry1Ac, cry1Ia, cry2Aa*, *cry2Ab* and *vip3Aa*  *cry1Aa, cry1Ab, cry1C, cry1D, cry1Ia, cry2Ab*, *cry9* and *vip3Aa* | 36.4±0.0  28.6±5.6  7.5±2.8 |
| INTA Mo4-6 | C | B and C | 130 and 65 | *cry1Ac, cry1E, cry1Ib, cry2Aa*, *cry2Ab* and *vip3Aa* | 20.0±2.3 |
| INTA Mo5-8 | C | B and C | 130 and 65 | *cry1Aa, cry1Ac, cry1Ia, cry2Aa*, *cry2Ab* and *vip3Aa* | 30.6±2.4 |
| INTA Mo8-1  INTA Mo8-2 | C | B and C  B and C | 130 and 65  130 and 65 | *cry1Aa, cry1Ab, cry1Ac, cry1Ia, cry2Aa*, *cry2Ab* and *vip3Aa*  *cry1Aa, cry1Ac, cry1Ia, cry2Aa*, *cry2Ab* and *vip3Aa* | 37.7±6.3  30.9±4.2 |
| INTA Mo9-1  INTA Mo9-5 | C | B and C  B | 130 and 65  130 | *cry1Aa, cry1Ac, cry1Ia, cry2Aa*, *cry2Ab* and *vip3Aa*  *cry1Ac*, *cry2Ab* and *vip3Aa* | 44.7±3.2  31.3±3.5 |
| INTA Mo14-1  INTA Mo14-2  INTA Mo14-3 | C | B and C  B and C  B and C | 130 and 65  130 and 65  130 and 65 | *cry1Ab, cry1Ac, cry1Ia, cry2Aa*, *cry2Ab* and *vip3Aa*  *cry1Aa, cry1Ac, cry1Ia, cry2Aa*, *cry2Ab* and *vip3Aa*  *cry1Aa, cry1Ab, cry1Ac, cry1Ia, cry2Aa*, *cry2Ab* and *vip3Aa* | 28.6±2.2  15.3±2.4  33.8±3.6 |
| INTA Mo15-2 | C | B and C | 130 and 65 | *cry1Aa, cry1Ac, cry1Ia, cry2Aa*, *cry2Ab* and *vip3Aa* | 27.5±7.4 |
| INTA Mo17-1 | C | B and C | 130 and 65 | *cry1Aa, cry1Ac, cry1Ia, cry2Aa*, *cry2Ab* and *vip3Aa* | 20.0±5.2 |
| INTA Mo22-4 | C | B and C | 130 and 65 | *cry1Aa, cry1Ac, cry1Ia, cry2Aa*, *cry2Ab* and *vip3Aa* | 34.2±3.9 |
| INTA Mo23-2 | C | B and C | 130 and 65 | *cry1Aa, cry1Ac, cry1Ia, cry2Aa*, *cry2Ab* and *vip3Aa* | 25.4±5.5 |
| INTA Mo26-1 | C | B and C | 130 and 65 | *cry1Aa, cry1Ac, cry1Ia, cry2Aa*, *cry2Ab* and *vip3Aa* | 29.0±6.3 |
| INTA Mo27-1 | C | B and C | 130 and 65 | *cry1Aa, cry1Ac, cry1Ia, cry2Aa*, *cry2Ab* and *vip3Aa* | 16.8±3.9 |
| INTA Mo28-4 | C | B and C | 130 and 65 | *cry1Aa, cry1Ab, cry1Ac, cry1Ia, cry2Aa*, *cry2Ab* and *vip3Aa* | 30.4±0.0 |
| INTA Mo29-1 | C | B and C | 130 and 65 | *cry1Aa, cry1Ab, cry1Ac, cry1Ia, cry2Aa*, *cry2Ab* and *vip3Aa* | 35.3±8.7 |
| INTA Mo32-3 | C | B and C | 130 and 65 | *cry1Aa, cry1Ac, cry1Ia, cry2Aa*, *cry2Ab* and *vip3Aa* | 34.3±1.8 |
| INTA Fo3-2 | A | B and C | 130 and 65 | *cry1Aa, cry1Ac, cry1Ia, cry2Aa*, *cry2Ab* and *vip3Aa* | 46.5±3.8 |
| INTA H13-5 | B | O | 130 | *cry9* | 3.9±1.5 |
| INTA H14-1 | B | B and C | 130 and 65 | *cry1Aa, cry1Ac, cry1Ia, cry2Aa*, *cry2Ab* and *vip3Aa* | 31.9±2.8 |
| INTA H17-4  INTA H17-5 | B | B and C  B and C | 130 and 65  130 and 65 | *cry1Aa, cry1Ac, cry1Ia, cry2Aa*, *cry2Ab* and *vip3Aa*  *cry1Aa, cry1Ab, cry1Ac, cry1Ia, cry2Aa*, *cry2Ab* and *vip3Aa* | 27.2±2.9  34.7±8.7 |
| INTA TA20-6 | D | B and C | 130 and 65 | *cry1Aa, cry1Ac, cry1Ia, cry2Aa*, *cry2Ab* and *vip3Aa* | 43.5±3.2 |
| INTA TA21-2 | D | B and C | 130 and 65 | *cry1Aa, cry1Ac, cry1Ia, cry2Aa*, *cry2Ab* and *vip3Aa* | 38.7±0.2 |
| INTA H22-2 | B | B and C | 130 and 65 | *cry1Aa, cry1Ac, cry1Ia, cry2Aa*, *cry2Ab* and *vip3Aa* | 15.4±6.2 |
| INTA TA24-2  INTA TA24-6  INTA TA24-10 | D | B and C  B  B and C | 130 and 65  130  130 and 65 | *cry1Aa, cry1Ac, cry1Ia, cry2Aa*, *cry2Ab* and *vip3Aa*  *cry1Ac*, *cry2Ab* and *vip3Aa*  *cry1Aa, cry1Ab, cry1Ac, cry1Ia, cry2Aa*, *cry2Ab* and *vip3Aa* | 23.6±2.4  31.5±2.9  36.0±8.6 |
| INTA TA1-11  INTA TA1-13 | D | B and C  B and C | 130 and 65  130 and 65 | *cry1Aa, cry1Ac, cry1Ia, cry2Aa*, *cry2Ab* and *vip3Aa*  *cry1Aa, cry1Ab, cry1Ac, cry1Ia, cry2Aa*, *cry2Ab* and *vip3Aa* | 28.6±3.1  31.9±6.4 |
| INTA H1-1  INTA H1-2 | B | B and C  B and C | 130 and 65  130 and 65 | *cry1Aa, cry1Ab, cry1Ac, cry1Ia, cry2Aa*, *cry2Ab* and *vip3Aa*  *cry1Aa, cry1Ac, cry1Ia, cry2Aa*, *cry2Ab* and *vip3Aa* | 29.0±2.5  19.4±6.4 |
| INTA H2-5  INTA H2-12 | B | B and C  B and C | 130 and 65  130 and 65 | *cry1Aa, cry1Ac, cry1Ia, cry2Aa*, *cry2Ab* and *vip3Aa*  *cry1Aa, cry1Ab, cry1Ac, cry1Ia, cry2Aa*, *cry2Ab* and *vip3Aa* | 20.8±4.2  22.1±2.7 |
| INTA H3-2  INTA H3-3  INTA H3-5 | B | B and C  B and C  B and C | 130 and 65  130 and 65  130 and 65 | *cry1Aa, cry1Ac, cry1Ia, cry2Aa*, *cry2Ab* and *vip3Aa*  *cry1Ab, cry1Ac, cry1Ia, cry2Aa*, *cry2Ab* and *vip3Aa*  *cry1Aa, cry1Ab, cry1Ac, cry1Ia, cry2Aa*, *cry2Ab* and *vip3Aa* | 27.8±2.4  35.7±8.1  38.3±2.8 |
| INTA H4-1  INTA H4-3 | B | B and C  B and C | 130 and 65  130 and 65 | *cry1Aa, cry1Ab, cry1Ac, cry1Ia, cry2Aa*, *cry2Ab* and *vip3Aa*  *cry1Ab, cry1Ac, cry1Ia, cry2Aa*, *cry2Ab* and *vip3Aa* | 17.0±6.9  15.6±4.5 |
| INTA H5-2  INTA H5-5 | B | B and C  B and C | 130 and 65  130 and 65 | *cry1Aa, cry1Ac, cry1Ia, cry2Aa*, *cry2Ab* and *vip3Aa*  *cry1Aa, cry1Ab, cry1Ac, cry1Ia, cry2Aa*, *cry2Ab* and *vip3Aa* | 29.2±4.2  15.3±2.4 |
| INTA H6-3 | B | B and C | 130 and 65 | *cry1Aa, cry1Ab, cry1Ac, cry1Ia, cry2Aa*, *cry2Ab* and *vip3Aa* | 12.7±4.2 |
| INTA H7-3 | B | O | 130 | *cry9* | 3.1±1.2 |
| INTA H11-4 | B | B and C | 130 and 65 | *cry1Aa, cry1Ab, cry1Ac, cry1Ia, cry2Aa*, *cry2Ab* and *vip3Aa* | 37.5±4.2 |
| INTA H12-5 | B | B and C | 130 and 65 | *cry1Aa, cry1Ac, cry1Ia, cry2Aa*, *cry2Ab* and *vip3Aa* | 35.8±5.7 |
| INTA H42-1 | B | B and C | 130 and 65 | *cry1Aa, cry1Ab, cry1Ac* and *cry2Aa* | 22.8±4.7 |
| INTA H45-4 | B | B and C | 130 and 65 | *cry1Aa, cry1Ab, cry1Ac, cry1Ia, cry2Aa*, *cry2Ab* and *vip3Aa* | 20.8±4.2 |
| INTA H46-12  INTA H46-14  INTA H46-18 | B | B and C  O  B and C | 130 and 65  130  130 and 65 | *cry1Aa, cry1Ac, cry1Ia, cry2Aa*, *cry2Ab* and *vip3Aa*  *cry8*  *cry1Aa, cry1Ab, cry1Ac, cry1Ia, cry2Aa*, *cry2Ab* and *vip3Aa* | 15.3±2.4  0.0±0.0  52.5±3.5 |
| INTA H47-2  INTA H47-3 | B | B and C  O | 130 and 65  130 | *cry1Aa, cry1Ac, cry1Ia, cry2Aa*, *cry2Ab* and *vip3Aa*  *cry8* | 29.7±0.7  2.8±2.4 |
| INTA Pol49-6 | C | B and C | 130 and 65 | *cry1Aa, cry1Ac, cry1Ia, cry2Aa*, *cry2Ab* and *vip3Aa* | 35.6±1.1 |
| INTA Ep-3 | L | B and C | 130 and 65 | *cry1Ac, cry1E, cry1Ib, cry2Aa*, *cry2Ab* and *vip3Aa* | 15.3±2.4 |
| INTA Ep4-1 | L | B and C | 130 and 65 | *cry1Ac, cry1E, cry1Ib, cry2Aa*, *cry2Ab* and *vip3Aa* | 17.1±2.9 |
| INTA Ep-5 | L | B and C | 130 and 65 | *cry1Ac, cry1E, cry1Ib, cry2Aa*, *cry2Ab* and *vip3Aa* | 14.3±5.1 |
| INTA Ep-6 | L | B and C | 130 and 65 | *cry1Ac, cry1E, cry1Ib, cry2Aa*, *cry2Ab* and *vip3Aa* | 12.8±4.4 |
| INTA H48-5  INTA H48-8  INTA H48-12  INTA H48-34 | B | B and C  B and C  O  B and C | 130 and 65  130 and 65  130  130 and 65 | *cry1Ab, cry1Ac, cry1Ia, cry2Aa*, *cry2Ab* and *vip3Aa*  *cry1Aa, cry1Ac, cry1Ia, cry2Aa*, *cry2Ab* and *vip3A*  *cry8*  *cry1Aa, cry1Ab, cry1Ac, cry1Ia, cry2Aa*, *cry2Ab* and *vip3Aa* | 43.0±6.4  27.8±4.8  0.0±0.0  50.1±2.4 |
| INTA 78-2 | A | B and C | 130 and 65 | *cry1Aa, cry1Ac, cry1Ia, cry2Aa*, *cry2Ab* and *vip3Aa* | 16.7±7.2 |
| INTA 79-37  INTA 79-38 | A | B and C  B and C | 130 and 65  130 and 65 | *cry1Aa, cry1Ac, cry1Ia, cry2Aa*, *cry2Ab* and *vip3Aa*  *cry1Ac, cry1Ia, cry2Aa*, *cry2Ab* and *vip3Aa* | 29,2±7.2  11.1±2.4 |

a Twin strains were excluded. Isolates that keep the same first number were isolated from the same sample (e.g. INTA 79-37 and INTA 79-38 are different isolates obtained from the same soil sample). b (A) soil; (B) leaves; (C) stored product dust; (D) spider web; (E) death insect larva. d Mean ± SD; Spore-crystal suspensions tested at final concentration of 2.5 g/ml.