Table 1. Corn yield loss (%) model comparison among rectangular hyperbola, sigmoid, and polynomial quadratic models.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Model | Species | Model Selection† | Goodness of Fit‡ | |
| AICc | RMSE | ME |
| Rectangular hyperbola | *C. benghalensis* | 332.2 | 12.6 | 0.92 |
| *R. brasiliensis* | 0.64 |
| Sigmoid | *C. benghalensis* | 337.6 | 13.2 | 0.85 |
| *R. brasiliensis* | 0.58 |
| Polynomial quadratic | *C. benghalensis* | 343.1 | 19.4 | 0.90 |
| *R. brasiliensis* | 0.71 |

†Akeike’s information criterion (AICc).

‡Root mean square error (RMSE) and model efficiency (ME).

Table 2. Rectangular hyperbola model parameters estimate, SE (standard error), t-value and P-value of corn yield loss (%) caused by competition of *R. brasiliensis* and *C. benghalensis*.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameters† | Species | Estimate (±SE) | t-value | *P*-value |
|  |  | % |  |  |
| *I* | *R. brasiliensis* | 50.3 (±22.6) | 2.2 | 0.03 |
| *C. benghalensis* | 210.2 (±88.6) | 2.4 | 0.02 |
| *A* | *R. brasiliensis* | 82.1 (±23.1) | 3.6 | 0.00 |
| *C. benghalensis* | 108.6 (±11.1) | 9.7 | 0.00 |

†*I*: represents corn yield loss (%) per unit weed density as density approaches 0; *A*: represents corn yield loss (%) as density approaches ∞ (or maximum expected yield loss).

Table 3. Sigmoid parameters estimate, SE (standard error), t-value and P-value of corn yield loss (%) caused by competition of *R. brasiliensis* and *C. benghalensis*.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameters† | Species | Estimate (±SE) | t-value | *P*-value |
|  |  | % |  |  |
| *b* | *R. brasiliensis* | -1.5 (±1.4) | -1.1 | 0.29 |
| *C. benghalensis* | -3.2 (±5.1) | -0.6 | 0.54 |
| *c* | *R. brasiliensis* | 0.2 (±7.4) | 0.0 | 0.99 |
| *C. benghalensis* | -5.3 (±7.4) | 0.0 | 0.99 |
| *d* | *R. brasiliensis* | 67.2 (±26.9) | 2.5 | 0.01 |
| *C. benghalensis* | 93.4 (±8.4) | 11.1 | 0.00 |
| *e* | *R. brasiliensis* | 1.2 (±0.7) | 1.6 | 0.04 |
| *C. benghalensis* | 0.7 (±0.3) | 2.1 | 0.12 |

†*b*: slope; *c*: lower limit (weed competition at low densities); d: upper limit (maximum expected corn yield loss, %); *e*: inflection point (weed density which corn yield loss is 50% relative to *d*.

Table 4. Polynomial quadratic parameters estimate, SE (standard error), t-value and P-value of corn yield loss (%) caused by competition of *R. brasiliensis* and *C. benghalensis*.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameters† | Species | Estimate (±SE) | t-value | *P*-value |
|  |  | % |  |  |
| α | *R. brasiliensis* | -0.7 (±7.7) | -0.1 | 0.92 |
| *C. benghalensis* | 4.9 (±6.1) | 0.8 | 0.43 |
| a | *R. brasiliensis* | 35.5 (±9.1) | 3.8 | 0.00 |
| *C. benghalensis* | 65.5 (±7.3) | 9.0 | 0.00 |
| b | *R. brasiliensis* | -5.4 (±2.2) | -2.5 | 0.02 |
| *C. benghalensis* | -11.1 (±1.7) | -6.4 | 0.00 |

†α: intercept at Y-value when density equals zero; a is the slope of the equation; b is the quadratic term of the equation.

Table 5. Nested model selection criteria and goodness of fit of the rectangular hyperbola model parameters I and A of maize biomass reduction (%) with *R. brasiliensis* and *C. benghalensi*s.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Hypothesis | Species | Model Selection† | | Goodness of fit‡ | | |
| F-test | | AICc | RMSE | ME |
| F-value | *P*-value‡ |
| Different *I* and *A* (Full) | *R. brasiliensis* | - | - | 332.2 | 13.3 | 0.92 |
| *C. benghalensis* | 0.64 |
| Similar *I* and *A* (Red. I) | *R. brasiliensis* | 32.3 | 0.00 | 368.2 | 22.2 | 0.84 |
| *C. benghalensis* |
| Similar *I* but different *A* (Red. II) | *R. brasiliensis* | 4.1 | 0.04 | 333.9 | 14.0 | 0.94 |
| *C. benghalensis* | 0.69 |
| Similar *A* but different *I* (Red. II) | *R. brasiliensis* | 0.7 | 0.39 | 330.4 | 13.4 | 0.98 |
| *C. benghalensis* | 0.95 |

†F-test model selection; if P-value<0.05: significantly different models; if P-value>0.05: non-significantly different models. Akeike’s Information Criterion (AIC);

‡Root mean square error (RMSE) and model efficiency (ME).

Table 6. Rectangular hyperbola model parameters estimate, SE (standard error), t-value and P-value of corn yield loss (%) caused by competition of *R. brasiliensis* and *C. benghalensis*.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameters1 | Species | Estimate (±SE) | t-value | P-value‡ |
|  |  | % |  |  |
| *I* | *R. brasiliensis* | 37.0 (±6.2) | 5.9 | 0.00 |
| *C. benghalensis* | 228.3 (±100.2) | 2.3 | 0.02 |
| *A* | *R. brasiliensis* | 106.1 (±10.3) | 10.3 | 0.00 |
| *C. benghalensis* |

†*I*: represents corn yield loss (%) per unit weed density as density approaches 0; *A*: represents corn yield loss (%) as density approaches ∞ (or maximum expected yield loss).

‡\*\* P<0.05 and \*\*\* P-value<0.01.