

Figure 1: Scenario 1: Changes of a seed column after four model years (only four years are illustrated because of scales) in three rotations (2-year, 3-year, and 4-year) crossed with two corn weed management programs (conventional and low herbicide). The model started at year 0 with 1000 and 0 seeds per squared meter at the top (0-2 cm) and bottom (2-20 cm) strata, respectively. The red horizontal line shows the number of seeds at the top stratum at the begining of the model clock.

Table 1: Scenario 2 - Elasticity of population growth rates in three rotations crossed with two corn weed management programs to lower-level demographic parameters

| Crop\_ID | Corn\_weed\_management | st1\_1\* | st2\_1\* | st1\_2\* | st2\_2\* | 1-sum(e)§ | sss\_1† | sss\_2† | f\_1⁋ | f\_2⁋ | f\_3⁋ | f\_4⁋ | f\_5⁋ | f\_6⁋ | ft1\_1⌇ | ft2\_1⌇ | ft1\_2⌇ | ft2\_2⌇ | wss\_1⍑ | wss\_2⍑ |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| C2 | conv | 1,466.84 | 1,437.21 | 0.12 | 0.11 | 1,522.79 | 0.05 | 0.02 | **4,099,185,668.80** | 990,125,323 | 237,420,871.69 | 50,445,968.31 | 22,152,907.95 | 28,440,558.71 | 0.04 | 0.05 | 0.07 | 0.08 | 1,407.87 | 0.02 |
| C2 | low | 1,040.05 | 1,019.03 | 0.08 | 0.08 | 1,075.11 | 0.03 | 0.02 | **2,766,736,655.89** | 668,282,983 | 160,246,712.80 | 34,048,399.11 | 14,952,058.14 | 19,195,894.66 | 0.03 | 0.04 | 0.05 | 0.05 | 998.23 | 0.01 |
| S2 | conv | 1,224.96 | 1,199.30 | 855.64 | 837.72 | 2,092.52 | 0.99 | 0.43 | 2,093,885,714.17 | **14,238,156,534** | 711,346,410.36 | 517,111,697.67 | 414,505,814.44 | 395,211,907.50 | 1.47 | 0.83 | 1.00 | 0.57 | 1,684.99 | 0.00 |
| S2 | low | 868.54 | 850.35 | 606.68 | 593.98 | 1,513.48 | 0.70 | 0.30 | 1,228,712,929.01 | **8,355,091,637** | 417,425,137.15 | 303,446,279.03 | 243,236,127.89 | 231,914,271.71 | 1.04 | 0.59 | 0.71 | 0.40 | 1,194.72 | 0.00 |
| C3 | conv | 12.64 | 67.32 | 687.06 | 3,659.78 | 1,052.30 | 0.03 | 0.02 | 5,592,860,407.22 | **10,241,029,161** | 6,553,794,288.93 | 4,170,959,828.12 | 274,584,905.82 | 57,989,495.69 | 4.16 | 6.44 | 2.83 | 4.39 | 4,051.81 | 0.00 |
| C3 | low | 110.13 | 586.62 | 5,987.41 | 31,893.50 | 9,066.99 | 0.29 | 0.19 | 560,845,021.29 | **1,026,957,549** | 657,206,264.75 | 418,258,616.04 | 27,535,029.69 | 5,815,113.84 | 36.23 | 56.14 | 24.67 | 38.24 | 35,309.85 | 0.00 |
| S3 | conv | 3,560.69 | 2,425.33 | 0.17 | 0.12 | 3,767.47 | 0.00 | 0.00 | **4,430,424,819.92** | 884,087,490 | 219,595,694.18 | 18,713,992.16 | 38,195,564.95 | 83,849,529.43 | 0.03 | 0.05 | 0.05 | 0.07 | 4.89 | 3.41 |
| S3 | low | 31,029.99 | 21,135.75 | 1.49 | 1.02 | 33,065.92 | 0.00 | 0.00 | **97,536,117,996.12** | 19,463,249,057 | 4,834,414,849.40 | 411,989,870.50 | 840,878,083.09 | 1,845,953,363.11 | 0.26 | 0.40 | 0.40 | 0.60 | 42.66 | 29.74 |
| O3 | conv | 5.07 | 7.27 | 3.57 | 5.11 | 10.31 | 0.00 | 0.00 | 34,174,840.90 | **303,196,630** | 370,916.67 | 5,688,132.59 | 354,078.03 | 354,071.33 | 0.00 | 0.04 | 0.01 | 0.21 | 0.93 | 3,911.43 |
| O3 | low | 44.21 | 63.33 | 31.11 | 44.57 | 89.86 | 0.00 | 0.00 | 2,873,761.48 | **25,495,797** | 31,190.37 | 478,314.92 | 29,774.41 | 29,773.85 | 0.02 | 0.34 | 0.13 | 1.83 | 8.09 | 34,086.54 |
| C4 | conv | 0.02 | 0.02 | 1.23 | 1.21 | 1.25 | 0.01 | 0.00 | 732,440,602.93 | **1,645,017,490** | 15,670,814.43 | 1,247,105,405.17 | 61,862,197.17 | 18,259,659.49 | 0.01 | 0.01 | 0.00 | 0.00 | 1.84 | 0.00 |
| C4 | low | 0.03 | 0.03 | 1.82 | 1.79 | 1.72 | 0.01 | 0.00 | 4,514,711,997.21 | **10,139,771,288** | 96,593,790.20 | 7,687,069,384.22 | 381,314,201.65 | 112,551,247.76 | 0.02 | 0.02 | 0.00 | 0.00 | 2.74 | 0.00 |
| S4 | conv | 1.66 | 1.63 | 0.19 | 0.18 | 1.73 | 0.12 | 0.05 | 30,614,999.62 | **84,392,111** | 57,466,194.44 | 33,438,761.46 | 12,281,030.64 | 2,230,608.04 | 0.18 | 0.10 | 0.12 | 0.07 | 15,656.18 | 0.00 |
| S4 | low | 2.47 | 2.42 | 0.27 | 0.27 | 2.56 | 0.18 | 0.08 | 32,141,403.63 | **88,599,736** | 60,331,346.52 | 35,105,952.72 | 12,893,338.81 | 2,341,821.80 | 0.27 | 0.15 | 0.18 | 0.11 | 23,234.04 | 0.00 |
| O4 | conv | 13,622.02 | 13,336.57 | 127.87 | 125.19 | 12,781.83 | 18.59 | 39.29 | **8,360,399.81** | 1,850,989 | 241,204.83 | 335,121.62 | 335,121.62 | 361,855.36 | 35.22 | 43.38 | 52.93 | 65.20 | 286.31 | 34.27 |
| O4 | low | 20,215.32 | 19,791.70 | 189.75 | 185.78 | 18,968.23 | 27.58 | 58.30 | **6,486,555.88** | 1,436,120 | 187,142.80 | 260,009.71 | 260,009.71 | 280,751.53 | 52.26 | 64.38 | 78.55 | 96.76 | 424.88 | 50.85 |
| A4 | conv | 684.84 | 92.63 | 478.10 | 64.66 | 578.30 | 0.03 | 0.01 | 1,387,435.20 | **11,740,397** | 101,418.96 | 81,652.35 | 69,727.16 | 67,827.97 | 0.00 | 0.05 | 0.01 | 0.26 | 0.02 | 0.01 |
| A4 | low | 1,016.31 | 137.46 | 709.51 | 95.96 | 883.03 | 0.05 | 0.02 | 36,200.67 | **306,328** | 2,646.20 | 2,130.46 | 1,819.31 | 1,769.75 | 0.00 | 0.07 | 0.01 | 0.38 | 0.03 | 0.01 |
| \*st\_ij: the probability of seed movement from soil stratum i to j by pre-planting tillage | | | | | | | | | | | | | | | | | | | | |
| §1-sum(e): the probability of non-emerging seeds in the top (0-2 cm) soil stratum | | | | | | | | | | | | | | | | | | | | |
| †sss\_1 and sss\_2: the summer survival probabilities of the seeds in the top (0-2 cm) and bottom (2-20 cm) soil strata | | | | | | | | | | | | | | | | | | | | |
| ⁋f\_1 though f\_6: the individual fecundity of mature plants in cohorts 1 through 6 | | | | | | | | | | | | | | | | | | | | |
| ⌇ft\_ij: the probability of seed movement from soil stratum i to j by post-harvest tillage | | | | | | | | | | | | | | | | | | | | |
| ⍑wss\_1 and wss\_2: the overwinter survival probabilities of seeds in the top (0-2 cm) and bottom (2-20 cm) soil strata | | | | | | | | | | | | | | | | | | | | |
| All-zero columns are excluded. In Crop\_ID: C2 - corn in the 2 year rotation, S2 - soybean in the 2-year rotation, C3 - corn in the 3-year rotation, S3 - soybean in the 3-year rotation, O3 - oat intercroped with red clover in the 3-year rotation, C4 - corn in the 4-year rotation, S4 - soybean in the 4-year rotation, O4 - oat intercropped with alfalfa in the 4-year rotation, and A4 - alfalfa in the 4-year rotation. | | | | | | | | | | | | | | | | | | | | |

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| 4.7 | 3.2 | 1.3 | 0.2 | setosa |
| 4.6 | 3.1 | 1.5 | 0.2 | setosa |
| 5.0 | 3.6 | 1.4 | 0.2 | setosa |
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| aThis is footnote one | | | | |
| bThis is footnote two | | | | |
| cThis is footnote three | | | | |
| dThis is footnote four | | | | |