Supplementary Table 1. Regression parameter estimates for wild oat seed retention in wheat or fababean (combined across seeding rate or presented by seeding rate) (see Figure 1). Site-years are abbreviated as follows: La = Lacombe, Sc= Scott and StA= St. Albert (number indicates 2014 or 2015). Numbers in parentheses are standard errors; standard errors of ‘.’ indicates the estimate was restricted by the bounds imposed on the model and therefore non-estimable.

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| Site-year/ Trt | Line type | Sd. rate | Upper asymptote (D) | Lower asymptote (A) | Slope (B)/(M) | 50% seed loss date (GDD) | Intercept | Upper limit (L) | Segment 1 slope(U) | Segment 2 slope(V) | GDD breakpoint  (R) | Adj. R2 |
| La14/ Faba | Logistic |  | 99.6 (2.94) | 21.4 (3.22) | -19.8 (3.03) | 1064 (8) |  |  |  |  |  | 0.84 |
|  |  |  |  |  |  |
| La14/ Wheat | Logistic |  | 99.5 (1.60) | 20.3 (4.68) | -22.7 (3.12) | 1062 (7) |  |  |  |  |  | 0.95 |
|  |  |  |  |  |  |
| La15/ Faba | Logistic |  | 100 (.) | 10.1 (8.42) | -11.5 (1.11) | 1123 (22) |  |  |  |  |  | 0.93 |
|  |  |  |  |  |  |
| Sc14/ Faba | Logistic |  | 100 (.) | 39.2 (3.51) | -21.6 (3.65) | 1094 (10) |  |  |  |  |  | 0.72 |
|  |  |  |  |  |  |
| Sc14/ Wheat | Logistic |  | 100 (.) | 27.2 (5.73) | -21.8 (4.21) | 1062 (12) |  |  |  |  |  | 0.76 |
|  |  |  |  |  |  |
| Sc15/ Faba | Logistic |  | 100 (.) | 34.3 (4.97) | -15.1 (3.10) | 1100 (18) |  |  |  |  |  | 0.71 |
|  |  |  |  |  |  |
| StA14/ Faba | Logistic |  | 98.9 (2.56) | 10.6 (1.57) | -30.0 (4.00) | 1033 (4) |  |  |  |  |  | 0.93 |
|  |  |  |  |  |  |
| StA14/ Wheat | Logistic |  | 100 (.) | 0 (.) | -19.1 (1.25) | 1000 (4) |  |  |  |  |  | 0.89 |
|  |  |  |  |  |  |
| StA15/ Faba | Logistic |  | 100 (.) | 28.6 (7.55) | -12.9 (2.36) | 1078 (25) |  |  |  |  |  | 0.78 |
|  |  |  |  |  |  |
| StA15/ Wheat | Logistic |  | 100 (.) | 0 (.) | -10.7 (0.78) | 1053 (7) |  |  |  |  |  | 0.82 |
|  |  |  |  |  |  |
| La15/ Wheat | Segment |  |  |  |  |  |  | 97.5 (2.27) | 0.02 (0.02) | -0.14 (0.006) | 871(20) | 0.90 |
|  |
| Sc15/ Wheat | Linear | 1x |  |  | -0.17 (0.01) |  | 240.4 (14.3) |  |  |  |  | 0.79 |
| 2x | -0.14 (0.01) | 207.3 (9.14) |

Supplementary Table 2. Regression parameter estimates for cleavers seed retention in wheat or fababean (combined across seeding rate or presented by seeding rate) (see Figure 2). Site-years are abbreviated as follows: La = Lacombe, Sc= Scott and StA= St. Albert (number indicates 2014 or 2015). Numbers in parentheses are standard errors; standard errors of ‘.’ indicates the estimate was restricted by the bounds imposed on the model and therefore non-estimable.

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| Site-year/ Trt | Line type | Sd. rate | Upper asymptote (D) | Lower asymptote (A) | Slope (B)/(M) | 50% seed loss date (GDD) | Intercept | Upper limit (L) | Line segment 1 slope(U) | Line segment 2 slope(V) | GDD breakpoint  (R) | GDDsq (quadratic) | Adj. R2 |
| StA14/ Faba | Logistic |  | 95.3 (1.56) | 12.4 (2.17) | -33.3 (3.17) | 1116 (4) |  |  |  |  |  |  | 0.94 |
|  |  |  |  |  |  |  |
| StA14/ Wheat | Logistic |  | 97.1 (3.42) | 31.3 (32.72) | -31.9 (19.29) | 1125 (40) |  |  |  |  |  |  | 0.60 |
|  |  |  |  |  |  |  |
| StA15/ Faba | Logistic | 1x | 92.2 (2.01) | 0 (.) | -30.9 (3.43) | 1107 (6) |  |  |  |  |  |  | 0.94 |
| 2x | 96.1 (2.31) | 0 (.) | -17.9 (1.47) | 1083 (7) |  |  |  |  |  |  |
| StA15/ Wheat | Logistic |  | 94.9 (2.11) | 0 (.) | -16.6 (1.36) | 1060 (6) |  |  |  |  |  |  | 0.89 |
|  |  |  |  |  |  |  |
| La14/ Faba | Segment | 1x |  |  |  |  |  | 99.0 (4.16) | 0.004 (0.03) | -0.13 (0.02) | 1031 (39) |  | 0.70 |
| 2x |  |  |  |  |  | 99.7 (3.40) | 0.001 (0.02) | -0.21 (0.02) | 1052 (21) |  |
| La14/ Wheat | Segment |  |  |  |  |  |  | 99.3 (1.68) | 0.002 (0.011) | -0.18 (0.04) | 1082 (16) |  | 0.90 |
|  |  |  |  |  |  |  |
| La15/ Faba | Segment |  |  |  |  |  |  | 97.2 (3.79) | 0.02 (0.03) | -0.0007 (0.0002) | 946 (39) |  | 0.65 |
|  |  |  |  |  |  |  |
| La15/ Wheat | Segment |  |  |  |  |  |  | 96.9 (1.91) | 0.02 (0.01) | -0.0004 (0.0002) | 942 (40) |  | 0.67 |
|  |  |  |  |  |  |  |
| Sc15/ Faba | Segment | 1x |  |  |  |  |  | 95.8 (1.54) | 0.0001 (0.00004) | -0.12 (0.02) | 1134 (21) |  | 0.69 |
| 2x |  |  |  |  |  | 99.2 (2.30) | 0.00003 (0.0001) | -0.04 (0.01) | 1035 (71) |  |
| Sc15/ Wheat | Segment |  |  |  |  |  |  | 93.8 (7.51) | 0.02 (0.06) | -0.13 (0.04) | 1006 (77) |  | 0.27 |
|  |  |  |  |  |  |  |
| Sc14/ Faba | Linear | 1x |  |  | -0.02 (0.004) |  | 123.7 (4.00) |  |  |  |  |  | 0.28 |
| 2x |  |  | -0.06 (0.01) |  | 150.3 (11.64) |  |  |  |  |  |
| Sc14/ Wheat | Quadratic |  |  |  | 0.32 (0.20) |  | -51.9 (107.41) |  |  |  |  | -0.0002 (0.0001) | 0.22 |
|  |  |  |  |  |  |  |  |

Supplementary Table 3. Regression parameter estimates for canola seed retention in wheat or fababean (combined across seeding rate or presented by seeding rate) (see Figure 3). Site-years are abbreviated as follows: La = Lacombe, Sc= Scott and StA= St. Albert (number indicates 2014 or 2015). Numbers in parentheses are standard errors; standard errors of ‘.’ indicates the estimate was restricted by the bounds imposed on the model and therefore non-estimable.

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| Site-year/ Treatment | Line type | Seeding rate | Upper limit (L) | Line segment 1 slope(U) | Line segment 2 slope(V) | GDD breakpoint  (R) | Slope | Intercept | Adj. R2 |
| La14/Faba | Segmented | 1x | 99.7 (0.46) | 0.001 (0.002) | -0.11 (0.02) | 1196 (10) |  |  | 0.59 |
| 2x | 100.0 (0.54) | 0.0001 (0.003) | -0.014 (0.006) | 1124 (57) |  |  |
| La15/Faba | Segmented | 1x | 99.1 (0.48) | 0.003 (0.002) | -0.05 (0.009) | 1137 ( 17) |  |  | 0.49 |
| 2x | 99.8 (0.48) | 0.001 (0.002) | -0.02 (0.01) | 1105 (41) |  |  |
| Sc14/Faba | Segmented |  | 98.6 (0.70) | 0.005 (0.005) | -0.024 (0.004) | 1111 (36) |  |  | 0.41 |
|  |  |  |
| Sc15/Faba | Segmented |  | 100.00 (0.27) | 0.00001 (0.002) | -0.006 (0.002) | 1093 (59) |  |  | 0.21 |
|  |  |  |
| StA14/Faba | Segmented | 1x | 98.8 (0.79) | 0.007 (0.006) | -0.09 (0.004) | 1058 (11) |  |  | 0.91 |
| 2x | 99.6 (0.83) | 0.003 (0.006) | -0.06 (0.005) | 1069 (18) |  |  |
| La14/Wheat | Linear |  |  |  |  |  | -0.001 (0.0003) | 101.3 (0.35) | 0.14 |
|  |  |  |  |  |
| La15/Wheat | Linear | 1x |  |  |  |  | -0.002 (0.0003) | 101.3 (0.30) | 0.22 |
| 2x |  |  |  |  | -0.005 (0.001) | 104.0 (0.99) |
| Sc14/Wheat | Linear |  |  |  |  |  | -0.01 (0.002) | 114.0 (1.76) | 0.45 |
|  |  |  |  |  |
| Sc15/Wheat | Linear |  |  |  |  |  | -0.004 (0.001) | 103.6 (1.13) | 0.13 |
|  |  |  |  |  |
| StA14/Wheat | Linear |  |  |  |  |  | -0.02 (0.002) | 111.1 (2.18) | 0.27 |
|  |  |  |  |  |
| StA15/Faba | Linear |  |  |  |  |  | -0.0003 (0.0001) | 100.3 (0.06) | 0.18 |
|  |  |  |  |  |
| StA15/Wheat | Linear |  |  |  |  |  | -0.003 (0.001) | 102.7 (0.54) | 0.23 |
|  |  |  |  |  |