

Comparing Straight Harvest with an Anti-shattering Agent to Swathed Harvest of Canola in the Evaluation of Field Scale Straight Combining Canola compared to Swathed Canola.

A: Plot scale comparisons of straight (with and without
an anti-shatter agent)
and swathed canola harvest

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Canola Liberty-Link hybrid Invigor 5500 was planted in early May at the Prosper field research site associated with the ND Ag. Expt. Station at Fargo. Standard production practices were applied for optimum production regarding seeding date, stand establishment, fertility, and pest management during the season. The study focus was on harvest management where different treatments were evaluated to observe their influence on seed yield. Producers are seeking alternatives to swathing canola as part of the harvesting procedure. The alternative is straight harvesting the crop. This exposes the crop to potential seed shatter losses. An anti-shattering compound, Spodnam, has been used in other crops to prevent pods from opening and shattering seeds onto the ground. This product was evaluated to determine its effectiveness. There were also swathed treatments, the current commercial practice for harvest, to compare with the straight harvest treatments. There was also a straight harvest treatment without Spodnam. Spodnam was applied at 1 pint/acre at two water volumes of 20 and 50 gallons per acre. All the treatments were harvested at four dates. The time between consecutive harvest dates was 7 days. This enabled the effect of delayed harvest from the optimum time to be evaluated for the treatments.

The experimental design was a RCB with a 4x4 factorial of harvest treatment and harvest date. Data collecting has not been completed for all the characters evaluated. Analysis for yield indicated the harvest treatment by harvest date interaction significant for yield and seed moisture content at harvest. For the swathed treatments yield was similar at harvest dates 1, 2, and 4 with yield at harvest date 3 lower than harvest date 1 (Table 1). For the straight harvest treatments yield was lower at harvest date 1 compared to harvest dates 2 and 3. Lower yield at the first harvest date may indicate mature seed was not threshed completely in the combine. This may be related to a high seed and pod moisture that prevented complete threshing. Yield was lower at date 4 compared to date 2 for all the straight harvest treatments. This indicates seed shatter losses at this date. For the Spodnam 20 treatment yield was also lower at harvest date 3 compared with harvest date 2. Again this indicates shatter yield losses. The Spodnam treatments do not appear to reduce shatter losses compared to the No-spodnam treatment. This is indicated by the same relative yield reductions at harvest date 4 for these treatments. Seed moisture was lower at harvest dates 3 and 4 compared to the earlier harvest dates for all the harvest treatments. This would be expected since the extended harvest period would allow greater time for the crop to drydown. The seed moisture was not greatly different for the swathed compared with straight treatments. This may have been related to relatively dry conditions during the harvest period. Precipitation events would perhaps be expected to influence seed moisture in the swathed treatments more so than the straight harvest treatments.

Additional work is required to finish data collection for the other evaluated characters. At this point in the evaluation of the harvest treatments straight harvest appears to be promising. Further study should evaluate other cultivars and more site-years of information. The effectiveness of Spodnam to reduce shatter compared to the No-spodnam treatment was not evident in this study.

Table 1. Mean canola yield and seed moisture at harvest for 12 harvest treatments at Prosper, ND, in 2007.

| Harvest Treatment | Date | Yield lb/acre | Seed moisture % |
|-------------------|------|---------------|-----------------|
| Swathed | D1 | 1450 | 15.8 |
| Swathed | D2 | 1430 | 23.6 |
| Swathed | D3 | 1160 | 11.7 |
| Swathed | D4 | 1280 | 11.1 |
| No spodnam | D1 | 1360 | 20.0 |
| No spodnam | D2 | 1700 | 18.3 |
| No spodnam | D3 | 1570 | 11.2 |
| No spodnam | D4 | 1090 | 10.7 |
| Spodnam 20† | D1 | 1440 | 19.5 |
| Spodnam 20 | D2 | 1780 | 21.1 |
| Spodnam 20 | D3 | 1530 | 11.1 |
| Spodnam 20 | D4 | 1290 | 11.4 |
| Spodnam 50‡ | D1 | 1590 | 20.6 |
| Spodnam 50 | D2 | 1740 | 21.0 |
| Spodnam 50 | D3 | 1640 | 11.2 |
| Spodnam 50 | D4 | 1080 | 11.2 |
| LSD (0.05) | | 230 | 2.3 |
| CV% | | 11.2 | 10.5 |

† - Spodnam applied with 20 gallons water per acre at 40 psi pressure.

‡ - Spodnam applied with 50 gallons water per acre at 40 psi pressure.

Seeding date 18 May; seeding rate 6 lb/acre; harvest dates

D1 (17 August); D2 (24 August); D3 (31 August); and D4 (7 Sept.)

| | Yield | Test Weight | Oil Content |
|---------------------|----------|-------------|-------------|
| Treatment | lb/A | lb/bu | % |
| Swath Optimum | 2426 a-d | 52.8 a | 44.0 |
| Swath 7 d delay | 2245 cd | 52.5 a | 41.6 |
| Swath 14 d delay | 2264 cd | 51.4 b | 42.3 |
| Swath 21 d delay | 2168 d | 49.7 d | 41.6 |
| Straight Optimum | 2456 a-d | 52.2 a | 42.2 |
| Straight 7 d delay | 2689 a | 52.3 a | 41.6 |
| Straight 14 d delay | 2459 a-d | 52.2 a | 42.9 |
| Straight 21 d delay | 2599 ab | 50.7 c | 44.4 |
| Straight Optimum | 2517 abc | 52.3 a | 44.0 |
| Spodnam | | | |
| Straight 7 d delay | 2489 abc | 52.2 a | 42.6 |
| Spodnam | | | |
| Straight 14 d delay | 2562 ab | 52.2 a | 43.0 |
| Spodnam | | | |
| Straight 21 d delay | 2637 ab | 50.7 bc | 42.8 |
| Spodnam | | | |
| Mean | 2463 | 52.0 | 43.1 |
| LSD (P=.05) | 295 | 0.7 | NS |
| CV | 8 | 0.9 | 3.7 |

Comparing straight harvest with an anti-shattering agent to swathed harvest of canola.
2006 Hettinger

InVigor 5550 was seeded on April 13, 2006. Seedling emergence was on April 20 and canopy closure was on May 30. 10% bloom was on June 15 and 90% bloom was on June 28. Swathing (Swath) was done on July 14. Spodnam treatments were applied on July 14 at a per acre rate of 1 pint in 20 gallons of water (Spodnam 20) and 1 pint in 40 gallons of water (Spodnam 40). The first harvest date (Optimum) was on July 24. This was followed by a 4 day delay (July 28), 10 day delay (August 3), 16 day delay (August 9) and 21 day delay (August 14) in harvest. Seed shatter was determined by counting the number of seeds that had fallen onto a 3.5 x 9 inch sticky board that had been placed on the ground under each plot on July 24 and collected just prior to harvest.

| Harvest Method | Harvest Timing | Seed Shatter | Harvest Moisture | Green Seed | Oil Content | Seed Yield |
|----------------|----------------|--------------|------------------|------------|-------------|------------|
| | | Seeds | % | % | % | lbs/ac |
| Swath | Optimum | -- | 6.9 | 2.0 | 32.8 | 540 |
| Straight | Optimum | -- | 7.4 | 1.2 | 38.9 | 978 |
| Spodnam 20 | Optimum | -- | 7.3 | 0.8 | 38.7 | 861 |
| Spodnam 40 | Optimum | -- | 7.3 | 1.0 | 38.6 | 857 |
| Swath | 4 Day Delay | 165 | 6.3 | 0.2 | 38.7 | 598 |
| Straight | 4 Day Delay | 58 | 6.8 | 0 | 39.2 | 959 |
| Spodnam 20 | 4 Day Delay | 22 | 6.6 | 0 | 38.9 | 1041 |
| Spodnam 40 | 4 Day Delay | 26 | 6.6 | 0 | 39.5 | 963 |
| Swath | 10 Day Delay | 174 | 7.2 | 0 | 36.8 | 534 |
| Straight | 10 Day Delay | 77 | 7.3 | 0 | 39.3 | 787 |
| Spodnam 20 | 10 Day Delay | 134 | 7.5 | 0 | 39.6 | 916 |
| Spodnam 40 | 10 Day Delay | 59 | 7.6 | 0 | 38.4 | 796 |
| Swath | 16 Day Delay | 129 | 9.8 | 0 | 35.1 | 182 |
| Straight | 16 Day Delay | 321 | 10.0 | 0 | 37.4 | 365 |
| Spodnam 20 | 16 Day Delay | 291 | 10.9 | 0 | 37.0 | 419 |
| Spodnam 40 | 16 Day Delay | 163 | 10.0 | 0 | 37.0 | 395 |
| Swath | 21 Day Delay | 294 | 7.8 | 0 | 30.6 | 219 |
| Straight | 21 Day Delay | 648 | 7.8 | 0 | 31.3 | 145 |
| Spodnam 20 | 21 Day Delay | 201 | 7.8 | 0 | 33.1 | 198 |
| Spodnam 40 | 21 Day Delay | 531 | 7.8 | 0 | 32.8 | 182 |
| Trial Mean | | 165 | 7.8 | 0.3 | 36.7 | 597 |
| C.V. % | | 47.2 | 5.1 | 177 | 4.3 | 22.5 |
| LSD .05 | | 110 | 0.6 | 0.6 | 2.2 | 190 |
| LSD .01 | | 146 | 0.8 | 0.9 | 3.0 | 252 |

It appears that the physical act of swathing in this study probably resulted in significant seed shatter and yield loss. Spodnam did not appear to maintain seed retention to any greater degree over time than the swathed or straight harvested treatments.

Summary

The use of the anti-shatter agent Spodnam was not beneficial in reducing seed shatter as harvest date was delayed at either water volume. Both the non-Spodnam and Spodnam treatments exhibited seed shatter as harvest was delayed two to three weeks beyond the optimum time. Straight harvest of canola without yield reduction is possible if delays in harvest are not too extended. Oil content and green seed were not influenced by the harvest treatments whether swathed or straight harvested, or with or without Spodnam. Seed moisture tended to decrease as harvest was delayed for the straight harvest treatments when initial harvest moisture was moderately high.