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## UW – Madison Weed Science Renz Lab

# Aminopyralid Formulation Comparison in Wisconsin on Crown Vetch

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## Objective:

Compare formulations and rates of aminopyralid on their ability to control crown vetch.

## Summary:

Previous research has shown control of crown vetch to be effective with 5 fl oz/A of Milestone. This research is evaluating if the effectiveness of aminopyralid differs among two different formulations (715 vs 733). Applications were sprayed prior to flowering of crown vetch (May) in 2021 and while injury to crown vetch was similar 6 and 14 DAT, by 28 DAT 23 % lower injury was observed with 3 fl oz/A of 715 compared to 733. This reduced injury did not result in significant differences in cover among formulations when sprayed at the same rate throughout 2021. However, differences in control were observed 63 DAT with 3 and 5 fl oz/A of formulation 715 delivering nine percent more control than formulation 733. This did not continue to be significant by 104 DAT, however.

One year after treatment (385 DAT), 7 fl oz/A of either formulation was required to maximize control. Cover of crown vetch was kept below 10% with 7 fl oz/A of 715 but it only took 5 fl oz/A of 733; however due to high levels of variability neither differed at p=0.05. Other vegetation present did not completely fill the void due to reduction in crown vetch as bareground remained elevated in treated plots even 385 DAT. While variable, results confirm that aminopyralid is effective at long-term suppression of crown vetch, however unlike other experiments populations were still present one year after treatment. It is not clear why this occurred at this site and requires further investigation.

## Notes

Populations of crown vetch, while dense, are quite variable. This is not known why, but local fire fighters have historically used the site for practicing prescribed fire. This could have added variability into the results.

## Herbicide Treatments

| Treatment Number | Treatment | Rate |
|---|---|---|
| **1** | Nontreated Control | - |
| **2** | AEP 715 | 3 fluid ounces per acre (fl oz/A) |
| **3** | AEP 715 | 5 fl oz/A |
| **4** | AEP 715 | 7 fl oz/A |
| **5** | AEP 733 | 3 fl oz/A |
| **6** | AEP 733 | 5 fl oz/A |
| **7** | AEP 733 | 7 fl oz/A |

***All treatments included Non-ionic surfactant at a rate of 0.25% v/v.**

## Herbicide Application

| | |
|---|---|
| **Date** | May 18th, 2021, 10:00 AM-10:35 AM |
| **Equipment** | $CO_2$ pressurized 10-foot boom sprayer (20 GPA) |
| **Nozzles & spacing** | Eight TeeJet 11002VS nozzles with 15-inch spacing |
| **Regulator PSI** | 42 |

## Weather Data

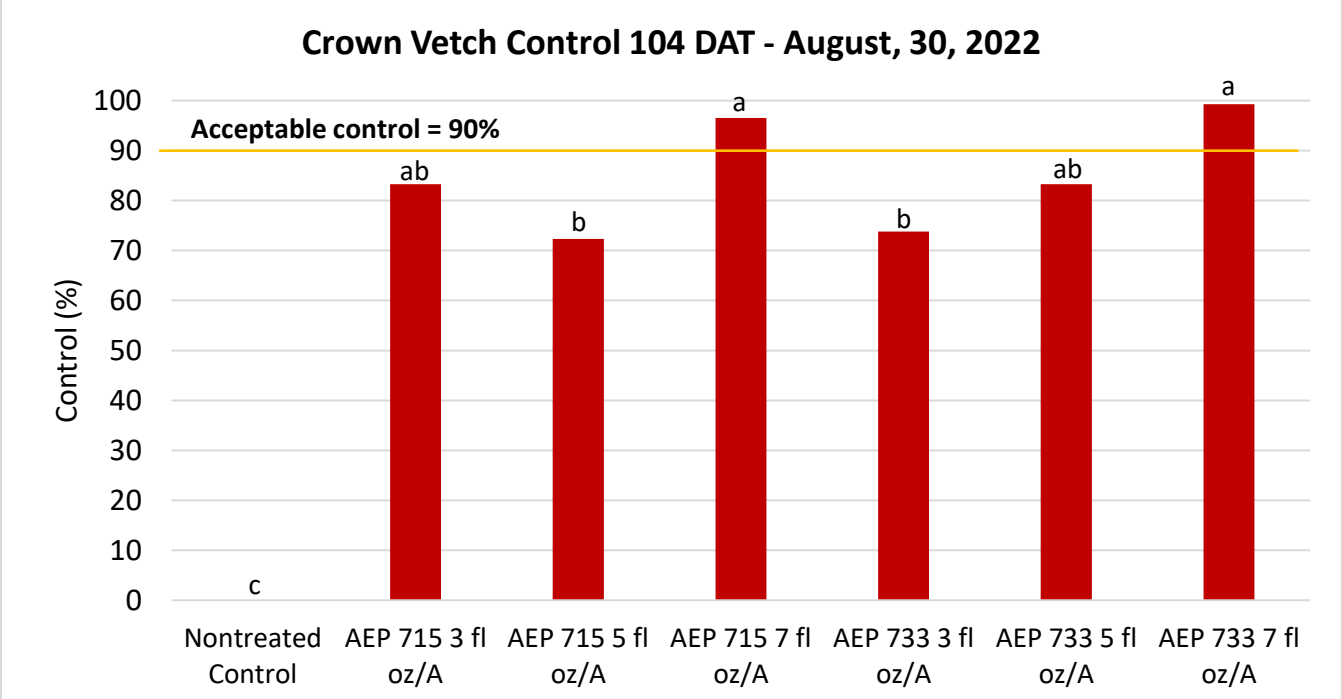
| | |
|---|---|
| **Weather Station** | KWIVERON58 |
| **Temperature** | 68.7°F – 69.1°F |
| **Wind Speed and Direction** | 5.4 mph SE – 4.3 mph SE |
| **Relative Humidity** | 74% - 74% |
| **Cloud Cover** | 80% |
| **When ≥ 0.25 inches of precipitation occurred after treatment** | May 27th, 2021, 6:30 PM – 0.45 inches |

| Research Plot Information | |
|---|---|
| **Plot Dimensions** | 10 feet x 25 feet |
| **Design** | Randomized Complete Block, 4 blocks |
| **Soil Type** | Griswold loam |
| **Soil Characteristics** | 17.6% clay, 0.9% organic matter, 7.4 pH, 6% slope |

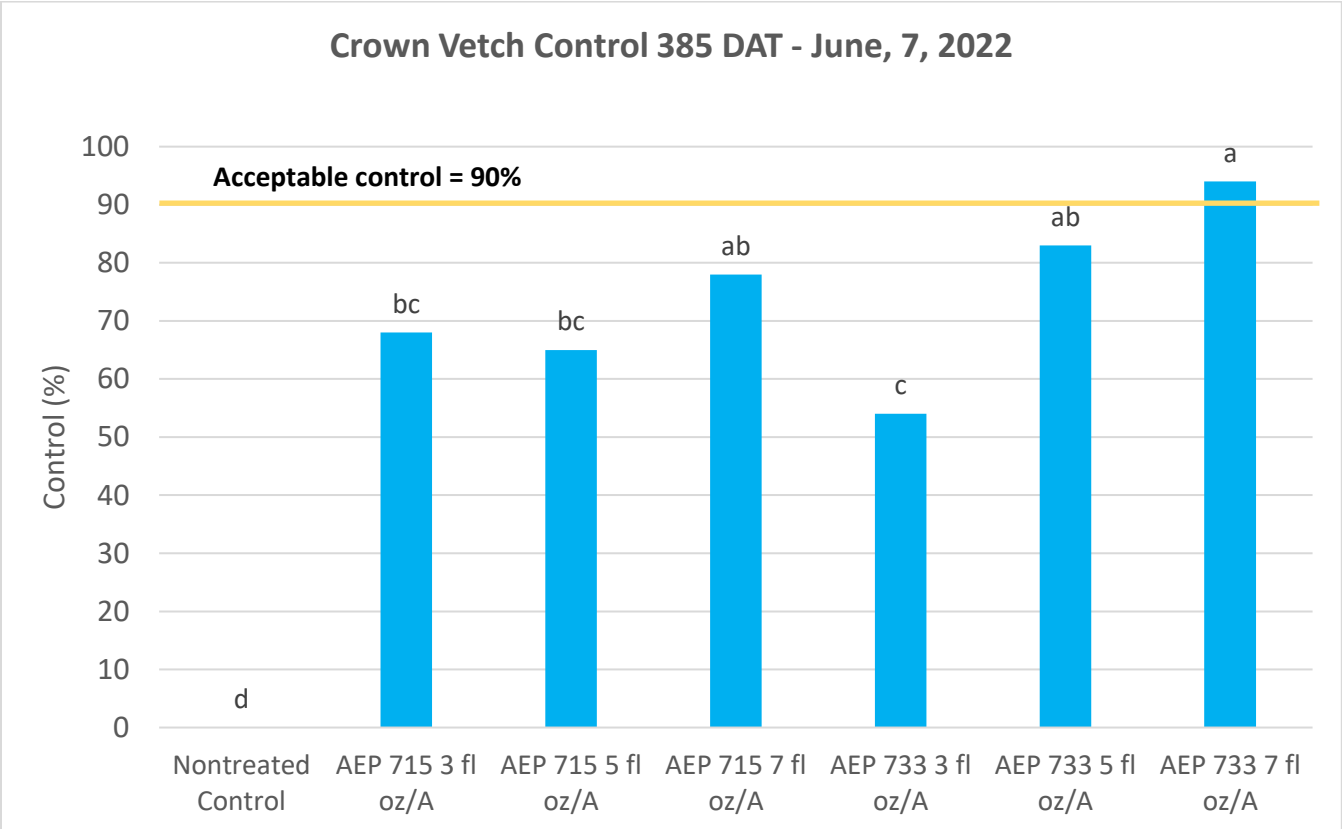
| Plants Present at Application – Developmental Stage | | |
|---|---|---|
| **Species** | **Average Height (in)** | **Phenological Stage** |
| Crown vetch (*Securigera varia*) | 7.2 | Vegetative |

## Index of Ratings and Results

Crown vetch phenology at application date – May 18th, 2021.




Bars labeled with the same letter do not significantly differ (P=0.05, LSD).



## Results:

| Pre-Application Rating – May 18th, 2021 | | | | | | |
|---|---|---|---|---|---|---|
| **Trt. No.** | **Treatment** | **Rate** | **Crown Vetch Cover (%)** | **Broadleaf Weeds Cover (%)** | **Grass Cover (%)** | **Bareground/ Litter Cover (%)** |
| **1** | Nontreated Control (NTC) | - | 48 - | 5 - | 30 - | 18 - |
| **2** | AEP 715 | 3 fl oz/A | 29 - | 8 - | 40 - | 24 - |
| **3** | AEP 715 | 5 fl oz/A | 55 - | 3 - | 29 - | 13 - |
| **4** | AEP 715 | 7 fl oz/A | 41 - | 6 - | 33 - | 20 - |
| **5** | AEP 733 | 3 fl oz/A | 56 - | 4 - | 30 - | 10 - |
| **6** | AEP 733 | 5 fl oz/A | 40 - | 5 - | 31 - | 24 - |
| **7** | AEP 733 | 7 fl oz/A | 28 - | 10 - | 31 - | 31 - |
| **Statistics[1]** | | | | | | |
| Least Significant Difference (LSD) P=.05 | | | 21.98 | 6.83 | 11.69 | 13.57 |
| Standard Deviation | | | 14.79 | 4.6 | 7.87 | 9.14 |
| Coefficient of Variation (CV) | | | 34.96 | 79.97 | 24.61 | 45.77 |
| Treatment Prob(F) | | | 0.0689 | 0.3982 | 0.5137 | 0.0667 |

Note: Means followed by same letter or symbol do not significantly differ (P=.05, LSD).

[1] All statistical analyses were conducted in ARM software and assumptions of ANOVA were not evaluated.

| 6 Days After Treatment (DAT) – May 24th, 2021 | | | |
|---|---|---|---|
| **Trt. No.** | **Treatment** | **Rate** | **Crown Vetch Injury (%)** |
| **1** | NTC | - | 0 b |
| **2** | AEP 715 | 3 fl oz/A | 40 a |
| **3** | AEP 715 | 5 fl oz/A | 50 a |
| **4** | AEP 715 | 7 fl oz/A | 48 a |
| **5** | AEP 733 | 3 fl oz/A | 38 a |
| **6** | AEP 733 | 5 fl oz/A | 45 a |
| **7** | AEP 733 | 7 fl oz/A | 45 a |
| **Statistics** | | | |
| LSD P=.05 | | | 14.59 |
| Standard Deviation | | | 9.82 |
| CV | | | 25.94 |
| Treatment Prob(F) | | | 0.0001 |

Note: Means followed by same letter or symbol do not significantly differ (P=.05, LSD).

| 14 DAT – June 1st, 2021 | | | |
|---|---|---|---|
| **Trt. No.** | **Treatment** | **Rate** | **Crown Vetch Injury (%)** |
| **1** | NTC | - | 0 b |
| **2** | AEP 715 | 3 fl oz/A | 59 a |
| **3** | AEP 715 | 5 fl oz/A | 68 a |
| **4** | AEP 715 | 7 fl oz/A | 63 a |
| **5** | AEP 733 | 3 fl oz/A | 64 a |
| **6** | AEP 733 | 5 fl oz/A | 64 a |
| **7** | AEP 733 | 7 fl oz/A | 69 a |
| **Statistics** | | | |
| LSD P=.05 | | | 17.06 |
| Standard Deviation | | | 11.49 |
| CV | | | 20.88 |
| Treatment Prob(F) | | | 0.0001 |

Note: Means followed by same letter or symbol do not significantly differ (P=.05, LSD).

| 28 DAT – June 15th, 2021 | | | | | |
|---|---|---|---|---|---|
| **Trt. No.** | **Treatment** | **Rate** | **Crown Vetch Injury (%)** | **Crown Vetch Cover (%)** | **Crown Vetch Control (%)** |
| **1** | NTC | - | 10 c | 84 a | 0 c |
| **2** | AEP 715 | 3 fl oz/A | 58 b | 5 b | 79 b |
| **3** | AEP 715 | 5 fl oz/A | 89 a | 4 b | 93 a |
| **4** | AEP 715 | 7 fl oz/A | 89 a | 8 b | 90 ab |
| **5** | AEP 733 | 3 fl oz/A | 80 a | 8 b | 88 ab |
| **6** | AEP 733 | 5 fl oz/A | 81 a | 5 b | 88 ab |
| **7** | AEP 733 | 7 fl oz/A | 94 a | 1 b | 95 a |
| **Statistics** | | | | | |
| LSD P=.05 | | | 16.34 | 6.89 | 12.38 |
| Standard Deviation | | | 11 | 4.64 | 8.33 |
| CV | | | 15.4 | 28.4 | 10.94 |
| Treatment Prob(F) | | | 0.0001 | 0.0001 | 0.0001 |

Note: Means followed by same letter or symbol do not significantly differ (P=.05, LSD).

| 63 DAT – July 20th, 2021 | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Trt. No.** | **Treatment** | **Rate** | **Crown Vetch Control (%)** | **Crown Vetch Cover (%)** | **Broadleaf Weeds Cover (%)** | **Grass Cover (%)** | **Bareground/ Litter Cover (%)** |
| **1** | NTC | - | 0 c | 68 a | 4 b | 24 c | 5 - |
| **2** | AEP 715 | 3 fl oz/A | 97 a | 1 b | 4 b | 81 ab | 15 - |
| **3** | AEP 715 | 5 fl oz/A | 90 b | 3 b | 3 b | 70 b | 24 - |
| **4** | AEP 715 | 7 fl oz/A | 100 a | 0 b | 3 b | 86 a | 11 - |
| **5** | AEP 733 | 3 fl oz/A | 88 b | 3 b | 8 a | 71 b | 19 - |
| **6** | AEP 733 | 5 fl oz/A | 99 a | 0.3 b | 4 b | 81 ab | 15 - |
| **7** | AEP 733 | 7 fl oz/A | 96 a | 1 b | 3 b | 75 ab | 21 - |
| **Statistics** | | | | | | | |
| LSD P=.05 | | | 6.16 | 3.66 | 2.54 | 13.63 | 11.88 |
| Standard Deviation | | | 4.14 | 2.46 | 1.71 | 9.18 | 7.99 |
| CV | | | 5.1 | 22.67 | 42.75 | 13.2 | 51.11 |
| Treatment Prob(F) | | | 0.0001 | 0.0001 | 0.0191 | 0.0001 | 0.0528 |

Note: Means followed by same letter or symbol do not significantly differ (P=.05, LSD).

| 104 DAT – August 30th, 2021 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Trt. No. | Treatment | Rate | Crown Vetch Control (%) | Crown Vetch Cover (%) | Broadleaf Weeds Cover (%) | Grass Cover (%) | Bareground / Litter Cover (%) | Crown Vetch Cover Reduction (%) |
| **1** | NTC | - | 0 c | 75 a | 9 - | 14 b | 3 - | 0 c |
| **2** | AEP 715 | 3 fl oz/A | 83 ab | 7 bcd | 14 - | 63 a | 16 - | 76 b |
| **3** | AEP 715 | 5 fl oz/A | 72 b | 13 bc | 8 - | 71 a | 9 - | 77 b |
| **4** | AEP 715 | 7 fl oz/A | 97 a | 3 cd | 9 - | 70 a | 19 - | 95 a |
| **5** | AEP 733 | 3 fl oz/A | 74 b | 14 b | 20 - | 57 a | 10 - | 74 b |
| **6** | AEP 733 | 5 fl oz/A | 83 ab | 3 bcd | 10 - | 73 a | 14 - | 92 a |
| **7** | AEP 733 | 7 fl oz/A | 99 a | 0.8 d | 10 - | 67 a | 23 - | 98 a |
| **Statistics** | | | | | | | | |
| LSD P=.05 | | | 21.96 | 10.56 | 17.33 | 22.52 | 15.16 | 14.4697 |
| Standard Deviation | | | 14.78 | 7.11 | 11.66 | 15.16 | 10.2 | 9.7401 |
| CV | | | 20.36 | 43.18 | 103.67 | 25.62 | 77.85 | 13.28 |
| Treatment Prob(F) | | | 0.0001 | 0.0001 | 0.7586 | 0.0004 | 0.162 | 0.0001 |

Note: Means followed by same letter or symbol do not significantly differ (P=.05, LSD).

| 385 DAT – June, 7, 2022 | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Trt. No.** | **Treatment** | **Rate** | **Crown Vetch Control (%)** | **Crown Vetch Cover (%)** | **Broadleaf Weeds Cover (%)** | **Grass Cover (%)** | **Bareground / Litter Cover (%)** |
| **1** | NTC | - | 0 d | 65 a | 8 - | 14 b | 13 b |
| **2** | AEP 715 | 3 fl oz/A | 68 bc | 14 b | 8 - | 36 a | 43 a |
| **3** | AEP 715 | 5 fl oz/A | 65 bc | 19 b | 9 - | 35 a | 37 a |
| **4** | AEP 715 | 7 fl oz/A | 78 ab | 9 b | 7 - | 38 a | 46 a |
| **5** | AEP 733 | 3 fl oz/A | 54 c | 21 b | 11 - | 35 a | 34 a |
| **6** | AEP 733 | 5 fl oz/A | 83 ab | 7 b | 6 - | 36 a | 51 a |
| **7** | AEP 733 | 7 fl oz/A | 94 a | 2 b | 9 - | 36 a | 53 a |
| **Statistics** | | | | | | | |
| LSD P=.05 | | | 16.97 | 16.20 | 7.90 | 11.29 | 16.56 |
| Standard Deviation | | | 11.43 | 10.91 | 5.32 | 7.60 | 11.15 |
| CV | | | 18.16 | 55.93 | 65.3 | 23.12 | 28.22 |
| Treatment Prob(F) | | | 0.0001 | 0.0001 | 0.9476 | 0.0047 | 0.0013 |

Note: Means followed by same letter or symbol do not significantly differ (P=.05, LSD).