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entomology

PEA LEAF WEEVIL EMERGING

Feeding injury by the adult pea leaf weevil (PLW) was recently found in field peas in southwest and northwest North Dakota (Sources: R. Buetow DREC and C. Keene WREC). Adults are weevils about 3/16 inch long, slender and greyish brown with a broad snout (Figure 1). Pea leaf weevil is an economic insect pest in field peas and faba beans. Clover and alfalfa are secondary hosts, but larvae do not fully develop on these crops. Since PLW was discovered on field peas during 2016 in Golden Valley County, North Dakota, PLW has increased its distribution in the state. It now occurs in 13 counties in western North Dakota (see map on next page). Thanks to funding support from the Northern Pulse Growers Association for the survey work.

Figure 1. Adult pea leaf weevil and eggs on soil (Photo courtesy of M. Dolinski, Canada)
Scouting should occur when field pea or faba beans have just emerged in the spring and temperatures have warmed up above 63°F. Instead of looking for adult weevils, it is easier to look for their feeding injury, half-moon leaf notches on the lowest leaves of the plant along field edges. Notches are small, half-moon-like semicircles in a symmetric pattern found around the leaf margins (Figure 2). Leaf feeding by the adult does not typically result in yield loss as the crop usually compensates and recovers. However, larvae feed on the nitrogen-fixing bacteria within root nodules and cause significant damage to nodules (Figure 3). This damage also reduces soil and plant available nitrogen for the current and future crops, which results in poor plant growth and lower crop yields.

For Integrated Pest Management (IPM) of PLW, cultural control and chemical control strategies are often used. 

**Cultural control** for PLW include:

- **Late-seeding of field peas** (by 10 days) reduces foliar leaf feeding injury by weevils because the pea emergence is delayed after the peak emergence and dispersal of weevils in spring.

- **Use of no-till systems:** Research comparing no-till and conventional till plots found that PLW was more attracted to conventional tillage. As a result, conventional tillage had higher leaf feeding injury by weevils and larval density on root nodules. Larvae also developed faster and the new generation of adults emerged earlier in conventional tillage than no-till. Another benefit of no-till is that this tillage system supports higher populations of the beneficial predators, such as ground beetles (Coleoptera: Carabidae).
Chemical Control:
Insecticidal seed treatments reduce defoliation from adults, egg laying and larval feeding on the root nodules. There are two active ingredients), registered in field peas: thiamethoxam (Cruiser 5F, Cruiser Maxx) and imidacloprid (Attendant 600, Dyna-Shield imidacloprid 5, Gaucho 600, Senator 600FS, other generics). There are no accurate risk forecasting models, so the decision to treat seed before planting is based on past field history of PLW populations and damage levels.

The Economic Threshold for a foliar insecticide application is recommended when 30% of the plants have half-moon shaped feeding notches in leaves from the seedling through the 6th node growth stage. However, optional foliar insecticidal control timing is difficult, because insecticides should be applied before the female PLW has the opportunity to lay eggs. Research studies have shown that insecticide seed treatments are more effective than foliar sprays, because of the long window of weevil emergence in the spring and multiple movements into fields.

For more information, read the NDSU Extension publication E1879 Integrated Pest Management of Pea Leaf Weevil in North Dakota.
(Note: Mention of any products are giving as examples only and do not imply an endorsement nor discrimination against any products not mentioned by the author or university.)

TJ Prochaska
Extension Crop Protection Specialist
NDSU North Central Research Extension Center

Janet J. Knodel
Extension Entomologist

MYSTERY INSECT
This beetle was found during field scouting last week. Do you know what it is?

It is a ‘good’ insect called ground beetles (Family Carabidae), which are important predators in the field. Ground beetles are known for preying on other insect pests and feeding on weed seeds. So, they provide natural control of both insect pests and weeds in field. Who won’t be scared of those huge pinching mandibles! This is a Pasimachus sp. (identified by A. Knudson, NDSU Plant Diagnostic Laboratory). There are about 2,000 species of ground beetles in North America.

Janet J. Knodel
Extension Entomologist
SUNFLOWER

The average North Dakota sunflower yield, as reported by the National Agricultural Statistics Service, has increased by about 15 pounds per acre per year since 1990 (Figure 1). The highest average annual yield in North Dakota was recorded during the 2018 growing season, with a yield of 1760 pounds per acre.

![Figure 1. Average North Dakota sunflower yields from 1990 through 2019. Source North Dakota Statistics Service.](image)

Every other year agronomist, sunflower scientists, and Extension staff conduct a random survey of sunflower fields to evaluate yield limiting factors and other production aspects. Some of the yield limiting factors are provided in Table 1. Besides drought, a producer can manage the other three factors (plant spacing, disease and weeds).

<table>
<thead>
<tr>
<th>Limiting Factors</th>
<th>2015</th>
<th>2017</th>
<th>2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plant spacing</td>
<td>13</td>
<td>19</td>
<td>16</td>
</tr>
<tr>
<td>Diseases</td>
<td>24</td>
<td>11</td>
<td>25</td>
</tr>
<tr>
<td>Drought</td>
<td>11</td>
<td>31</td>
<td>2</td>
</tr>
<tr>
<td>Weeds</td>
<td>8</td>
<td>8</td>
<td>6</td>
</tr>
</tbody>
</table>

Table 1. Some of the factors most limiting sunflower yield, based on data collected during the 2015, 2017 and 2019 National Sunflower Surveys.

Based on 201, 172, and 133 surveyed sunflower fields in 2015, 2017 and 2019, respectively. About 50% of the fields were located in North Dakota.
To maximize sunflower yields, producers are encouraged to pay attention to details.

Management suggestions are:

1) Select the best hybrid for the field (see ND Sunflower trial results A652-19)
2) Use seed with a high germination percent and uniform seed size
3) Use fungicide and/or insecticide seed treatments when needed
4) Fertilizer appropriately and use the sunflower nitrogen calculator
5) Plant now to early June
6) Aim for a correct plant population (20,000 to 22,000 established oil sunflower hybrid plants per acre on heavy soil and 16,000 to 18,000 on lighter soil and in low rainfall areas)
7) Plant seeds at 1.5 to 2 inches depth if the soil moisture is adequate (always seed to moisture)
8) Check planter adjustments, check depth and seed drop to make sure there will be no gaps between seeds while planting
9) Apply herbicides following the label and recommended rates for weed control
10) Scout for insect problems and use integrated pest management to control the insect pests
11) Monitor for sunflower diseases and apply foliar fungicides when needed
12) Reduce bird feeding of the sunflower seeds

Hans Kandel
Extension Agronomist Broadleaf Crops

TERMINATION TIMING OF A RYE COVER CROP WHEN PLANTING SOYBEANS

Planting soybeans into a rye cover crop is becoming more common in North Dakota. A well-established rye cover crop in the spring can protect the soil from erosion, suppress weeds, reduce soil nitrate levels and use excess moisture that might otherwise limit timely planting of soybeans. The downside of a vigorous cover crop is that it may hinder soybean establishment if soil moisture is limiting and potently suppress soybean growth if it shades the emerging soybean seedlings. The timing of rye termination, therefore, can be critical to the success of this system. Experiments were conducted in 2019 at two locations (central and northern valley locations) to quantify the effect of when rye was
terminated with glyphosate on soybean establishment and yield. Timings were at weekly intervals beginning two weeks before planting (during the first week of May) to two weeks after planting soybeans. When averaged across locations there was no effect of termination timing on soybean establishment and yield (Table 1). Weeds were more effectively suppressed by the heavier rye biomass when terminated later (also see Figure 1 which is a photo of one of the experiments about two weeks after the last rye termination timing). These data would point to later termination of rye being better than earlier.

We have continued this research this year. The rye cover crop developed little in April and early May. However, in the last 10 days rye has grown dramatically in both height and biomass. Rye at both experimental locations (south of Fargo this year), is now past the jointing stage. It has produced more biomass and is taller this year compared to last. Though the data from 2019 suggested that there were little negative impacts of terminating rye up to two weeks after planting soybeans, which may not be the case every year. Not only soil moisture status but the size of the rye plant can impact soybean establishment and early development. Soybean was planted at both locations last Friday (see Figure 2 for a picture of rye status at time of planting). There was adequate soil moisture to enable good germination. It will be interesting to see if the taller rye will interfere with the developing soybean plants significantly this year.

Table 1. Effect of rye termination timing on weed numbers, rye biomass (at time of termination) soybean stands and yield, average of two locations in 2019.

<table>
<thead>
<tr>
<th>Rye termination timing relative to soybean planting</th>
<th>Weed count 4 wks post planting (#/ft²)</th>
<th>Rye Biomass (gm/ft²)</th>
<th>Soybean population (#/acre)</th>
<th>Yield (bu/acre)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 weeks before planting</td>
<td>7.3</td>
<td>NA</td>
<td>106,000</td>
<td>40.3</td>
</tr>
<tr>
<td>1 week before planting</td>
<td>5.4</td>
<td>23.9</td>
<td>109,000</td>
<td>41.6</td>
</tr>
<tr>
<td>At planting</td>
<td>5.2</td>
<td>31.4</td>
<td>115,000</td>
<td>42.2</td>
</tr>
<tr>
<td>1 week post planting</td>
<td>1.8</td>
<td>47.3</td>
<td>105,000</td>
<td>39.5</td>
</tr>
<tr>
<td>2 weeks post planting</td>
<td>0.9</td>
<td>78.0</td>
<td>105,000</td>
<td>40.4</td>
</tr>
</tbody>
</table>

Figure 1. Rye residue quantity differed by termination timing, 2019. Photo taken about two weeks after the last rye termination date. At the earliest dates there was little residue remaining to suppress developing weeds.
PLANT POPULATION FOR HIGHEST RECOVERABLE SUCROSE

Optimum plant population:

Researchers at North Dakota State University and the University of Minnesota have demonstrated that a wide range of plant population with uniformly spaced plants resulted in high yield and recoverable sucrose, but plant populations of 175 to 200 plants per 100 foot of 22-inch wide rows consistently resulted in the maximum recoverable sucrose per acre. It is critical that the plants be evenly spaced within the rows. Populations lower than 100 plants /100 ft of row take longer for the canopy to cover the soil resulting in emergence of weeds later in the season. However, weed control is currently not a major problem for most growers since growers use herbicide tolerant technology that may be combined with soil applied herbicides.

Is it recommended to keep lower populations (because of pest or frost damage) or should fields be replanted?

If planting was done early, populations of 75 to 100 evenly spaced plants per 100 ft of 22 inch rows will produce higher yields than higher plant populations planted three or more weeks later in the growing season based on research conducted at NDSU (Figure 1). It is recommended that the grower visit the field with his agriculturist and be advised whether replanting is necessary. The grower should consider whether the variety of seed suitable for his/her field is available, are conditions conducive for replanting – is there adequate moisture for germination and emergence? Any replanting of sugarbeet because of poor stands should be considered carefully.

When is the best time to plant sugarbeet?

One of the important factors for high sugarbeet yields is to plant as early as is practical taking into consideration the possibility for a frost in May. Most growers aim to get their sugarbeet planting done from around April 12 (when insurance comes into effect) through early May based on field conditions. Wet field conditions have delayed planting especially in the central Red River Valley from Hillsboro to East Grand Forks. The good news is that growers planting...
later in the season will plant into warm and hopefully seedbeds with adequate moisture that will result in rapid and uniform emergence in about 5 to 7 days.

Cover crops.

The use of cover crops (Figure 2) such as oats, barley and wheat help to prevent reduction in sugarbeet plant stand from high winds, reduce soil erosion and also help to conserve moisture after they are killed-off with herbicide. Growers are encouraged to use cover crops especially in fields that are known to have a history of ‘blowing’ during high wind events that are common in the spring.

Be proactive in weed control.

In areas where beets have emerged, growers should be proactive, scout fields for weeds and take necessary measures to control weeds to avoid competition of the sugarbeet crop with weeds.

Figure 1. Picture of late planted and earlier planted sugarbeet. Research done at NDSU indicated that earlier planted populations of 75 to 100 plants/100’ row will provide higher recoverable sucrose than higher populations planted three week later.

Figure 2. Picture showing rows of a cover crop planted (and treated with a herbicide when about 4” tall) in a sugarbeet field.

Mohamed Khan
Extension Sugarbeet Specialist
NDSU & U of MN
COVERAGE CROPS AND PREVENTED PLANTING ON-LINE CAFÉ TALK
A series of “drop-in” zoom calls are set up to talk about options for cover crops and weed management on prevented planting acres. Each call will have a quick 10-15 minute introduction/presentation from 7:30 – 7:45 followed by over an hour of opportunity for Q and A. We know you’re busy, so come and go from the call as you want.

Hosted by: Joe Ikley (weed mgt), Naeem Kalwar, Abbey Wick (soil health)

Join Zoom Meeting
https://ndsu.zoom.us/meeting/register/tJ0sd-qhqT8vE9Eh8YsMNq4qsZNciz5zTbUco

Dial by your location
+1 301 715 8592 (or)
+1 312 626 6799
Meeting ID: 991 0397 4595
May 27, 2020 7:30 – 9:00 am CST
June 3, 2020 7:30 – 9:00 am CST
June 10, 2020 7:30 – 9:00 am CST
June 17, 2020 7:30 – 9:00 am CST
June 24, 2020 7:30 – 9:00 am CST

ND STATE UNIVERSITY
CROP & PEST REPORT
May 28, 2020

SOILS

AROUND THE STATE

NORTH CENTRAL ND
It was a welcomed site over the weekend to receive some measurable rainfall. Here are some quick precipitation reports from the last week (starting May 18th): Minot: 0.54” (NCREC: 0.59”); Bottineau: 0.58”; Garrison: 0.54”; Karlsruhe: 1.06”; Mohall: 0.14”; Plaza: 0.43”; and Rugby: 0.76”. Bare soil temperatures at the NCREC was observed at 61°F as of May 26th. A dryer pattern seems to be on tap as we look towards the next few days.

Planting continues throughout the region. Most small grains have emerged and are observed in the V1 stage. Pulses and canola have also emerged over the last week. Planting at the NCREC will focus on corn, soybean, and dry bean over the next week. Canola flea beetle populations continue to be low in the traps at the center. Those traps will shift from the overwintering sites into the canola fields this week for continued observation as those crops emerge. Growers continue to spray herbicides throughout the region as weather permits – hopefully, we can get some calmer days during the next week. Cutworm traps are now placed at the NCREC, however, have been negative thus far.
NORTHWEST ND

Northwest North Dakota is past the half-way mark of acres planted and probably close to ¾ done. Most pulse crops and small grains have been planted and warm-season crops like soybean and sunflower are going in. Planting continued last week until rain started falling on Saturday afternoon. Light to steady rain showers continued most of the day Sunday throughout the region. Rainfall totals ranged from 0.25-0.5” at most NDAWN stations with a few getting less and a few seeing 0.75-1.0.” The rain was welcome and more is needed to get crops off to a good start. Predicted highs for the coming week are in the 70’s with temperatures rising over the weekend with the upper 80’s possible on Sunday, May 31st.

Crop emergence and development are responding positively to the rain: at the Williston REC peas are V2-V3, lentil V1, spring wheat and durum V1-V2, and some of the winter wheat is jointing. Weeds are also growing quickly with Russian thistle now emerged and some narrowleaf hawksbeard starting to bolt. Below is a photo of Russian thistle taken on May 26th at the WREC with a key included for scale. This Russian thistle is about 4” wide.

Clair Keene
Extension Cropping Systems Specialist
NDSU Williston Research Extension Center

NORTHEAST ND

It’s been a great week for seeding progress. Small grains, canola, potatoes and sugarbeets are being seeded. Fertilizer is being applied to fields. Seeding bed conditions are variable. Some fields were worked a little wet and cloddy ground is present. Rainfall was variable in the last week, from no rainfall at Grand Forks to 1.34” at the Cando NDAWN station. Temperatures have finally warmed into the 70s F. Crucifer flea beetles were at moderate levels over Memorial Weekend when the sun was out and the wind was calm. Small grains are emerging to 2 lf stage. I’m finding cutworms and tiny nymph grasshoppers in the garden settings.

For the rest of the growing season, the northeast regional report will be submitted using the voices from our Northeast County Extension Agents. I’m taking a new position in NDSU Extension as East District Director in June. Thanks for reading my articles since 2012.

Lesley Lubenow
Extension Cropping Systems Specialist
NDSU Langdon Research Extension Center

SOUTH-CENTRAL/SOUTHEAST ND

Weather was cooperative last week for crop planting and development of established crops, and the forecast indicates more of the same this week. According to NDAWN, rainfall during May 1-25 ranged from 0.7 inch (Robinson) to 2.2 inches (Jamestown), with the Carrington REC receiving 1.2 inches. Most of the region’s fields have some wet sites and there will be numerous fields designated as ‘Prevent Plant’.

Alfalfa regrowth is at <12-inch height. Winter rye and winter wheat are in the jointing to heading stages, depending on last fall’s seeding dates. Small grain and corn planting generally will be completed this week. Barley and spring wheat seeded late April are at the 4- to 5-leaf stages. Based on growing degree day units, corn planted during
mid-May or before should be emerged. Planting continues with soybean and dry bean. Early planted corn has 1-2 leaves and soybean in the unifoliate (VC) stage.

Weed growth also has accelerated. We are concerned about PRE herbicide application and activation with the generally windy and dry weather, plus the ‘push’ to get crops planted. POST herbicide applications will need to be timely.

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Winter rye beginning to head

Newly emerged soybean (May 26)

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Greg Endres
Extension Cropping Systems Specialist
NDSU Carrington Research Extension Center
WEATHER FORECAST

The May 28 to June 3, 2020 Weather Summary and Outlook

This past spring has not recorded too many periods with above average temperatures, but this past week was one of them. The North Dakota Agricultural Weather Network (NDAWN) stations near the North Dakota/Montana border recorded temperatures near average, but the rest of the network recorded temperatures well above average with stations in northeastern North Dakota and northwestern Minnesota recording temperatures around 10 degrees above normal (Figure 1). These next 7 days are expected to finish near to a bit above average because of some warm air coming next week, but in the short term, today (Thursday) through the weekend will be chilly. This colder air will bring frost (36° or cooler) possibilities especially in areas near and north of Highway 2 on both Friday and Saturday mornings. In fact, parts of northern Minnesota may even get into the 30s again on Sunday morning.

![Figure 1](attachment:departure_from_normal_average_temperature.png)

**Figure 1. Departure from Normal Average Temperature from May 20 to May 26, 2020 at selected NDAWN stations**

Last week I had mentioned that rainfall amounts in the next 7 days would probably be highly variable across the region. That was certainly the case with rainfall totals ranging from a trace to well over 1 inch. The heaviest rain fell in parts of northcentral and northeastern North Dakota (Figure 2)
The highest total at a NDAWN station was at the Niles where 2.11 inches total was measured, with 1.75 inches of that recorded on May 23 through May 24 at 1:00 PM (Figure 3). Those higher totals were associated with a band of thunderstorms that formed along a frontal boundary on May 23, 2020 with then some additional post frontal precipitation on May 24. Although there will likely be some scattered precipitation during this next week, as of this writing it does not appear that most locations will record much in the way of rain until the middle or end of next week.

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Figure 2. Rainfall totals from May 20 to May 26, 2020 at selected NDAWN stations

Figure 3. Rainfall from May 23 through 1PM on May 24, 2020 at selected NDAWN stations
A ridge of high pressure aloft is forming to our west. This will push the jetstream well north into far western Canada. In turn, that will shift the upper-level wind to the north or northwest over the northern plains this weekend. That northerly flow will allow some chilly Canadian air will move into the region beginning today and lingering through Sunday. Once we move beyond the weekend, that ridge of high pressure will shift east and be centered over North Dakota. This will mean an extended period of warm temperatures next week. As previously mentioned the colder air in the short term could mean areas of frost, especially over northern areas that have drier soils or in the lower portions of fields.

The projected growing degree days (GDDs) base 32°, 44° and 50° for the period of May 28 through June 3, 2020 can be found in Figure 4. Most of the GDDs this period will come next week with the projected warmer temperatures.

![Projected Growing Degree Days for the period of May 28 to June 3, 2020](image)

**Figure 4. Projected Growing Degree Days for the period of May 28 to June 3, 2020**

One final note. If you need access to historical NDAWN data from a station not yet available on our website. All NDAWN stations have a “cloud service” available to them. These additional data are available at: stationname.ndawn.org. Examples would be crystal.ndawn.org and webster.ndawn.org. If the station is two words, then an example would be saintthomas.ndawn.org or forestriver.ndawn.org. The NDAWN team has installed new stations near Glyndon, MN and Stirum, ND and those data are available at glyndon.ndawn.org and stirum.ndawn.org.

Daryl Ritchison
Meteorologist
Director of the North Dakota Agricultural Weather Network

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This publication is supported in part by the Crop Protection and Pest Management Program [grant no. 2017-70006-27144 / accession 1013592] from the USDA National Institute of Food and Agriculture.