Will It or Won’t It?
A Brome Recovery Discussion...

Meadowlark Extension District
Oskaloosa City Hall/NEK Heritage Complex
Armyworm feeding has been the most commonly associated culprit of brome issues from last fall. While new for some, it’s likely present more than we like to think.
Where we came from...

- What do we know about armyworms?
  - They don’t overwinter in Kansas – moths fly in from the south each spring
  - They don’t always land in the same spots
  - Timing of arrival can be different from year to year
  - Natural pests may take care of many of them in any given year
  - We may see them almost every year – with less noticeable damage
  - Larvae move across stands en masse
    - Look for brown spots or birds
    - Mature size: 1 ¼ - 1 ½ “
      - Egg hatch to maturity takes just over two weeks (temperature dependent)
      - Entire life cycle: 3-4 weeks
  - Early stages do little damage
    - Look for them at the base of seedlings during cooler parts of the day
  - Feeding requirements increase as larvae grow – later instars do the most damage
  - Control becomes increasingly difficult as larvae develop and approach maturity
  - Multiple infestations are a possibility...
Stand establishment is threatened simply means: if feeding continues, it could contribute to stand loss. This is generally NOT wholly because of armyworm feeding, with other factors playing a role as well. Knowing the factors contributing to overall stand health is important to note as you start to evaluate armyworm feeding injury.

NOTE: Some states advocate for treatment at even lower levels.
Where we came from...
While blamed mostly on armyworm feeding, other factors played in to the level of damage as well...

<table>
<thead>
<tr>
<th>Where we came from...</th>
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<tbody>
<tr>
<td>• Knowing all of the above, what made it such an issue?</td>
</tr>
<tr>
<td>– Late harvest</td>
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<tr>
<td>– Dry conditions</td>
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<tr>
<td>– Fertility?</td>
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<tr>
<td>– Cutting height?</td>
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<tr>
<td>– Spring frost injury?</td>
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<tr>
<td>– Multiple feedings?</td>
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<td>– Injury in previous seasons?</td>
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All of the above??
The arrow on the left and circle on the right indicate the time frame of early armyworm feeding reports. They coincided closely with drops in soil moisture from late season drought stress. Stands that may well have outgrown armyworm feeding seemed to stop because of the lack of moisture.
Where we are...

- **Stand Evaluation:**
  - **Good:** walk across the stand and note the differences.
    - Grass that had a chance to recover last fall will be markedly different.
    - Drag your foot along the ground in spots as well.
      - If everything seems to pull away from the soil surface and turn to powder = Not good.
  - **Better:** Walk the stand doing the above – with a shovel!
    - Break root masses apart and look for new shoots
    - If soil is crumbly with no structure, it could mean roots have shrunk away.
    - Can you see moisture differences between areas? Good moisture levels after a dry fall/winter
      MAY mean trouble...
  - **Best:** Look at roots underneath magnification
    - Outer roots will have a brown color to them
      - Inner roots white = good
      - Inner roots brown = could be trouble...

These are suggestions for how to do some stand evaluations. Be sure to walk the entirety of the stand and try to estimate the area damaged as you do. This will help determine the need for reseeding and amounts needed to do so as well as give an idea of lost production.
From upper left to lower right are images of square core samples pulled from a brome field in JA Co. Note the cover in the upper left and the increasing greenness as it takes off growing.
This is from the same field as the previous picture only further down the hill. Feeding was a little heavier than in the previous pictures, but this part of the field recovered before fall. There were no soil test differences across the three sets of samples on this farm.
This is from the bottom of the field where feeding was the worst and the stand seemed to get heavily fed on multiple times. The stand already had some issues from a weed pressure standpoint and had some wet areas as well and this became too much for it. There is some very slight level of regrowth, but it’s very thin...
This is a picture of roots under magnification. The exterior color of roots may be fairly dark brown, but if you peel them back carefully, you’ll start to notice more of a cream colored inner root, suggesting it is healthy.

The picture at right shows new shoots starting below ground. Shoots are 2+ weeks behind the more ‘normal’ areas of the field.
For ease of discussion, I’ve broken your options in to three different categories.

If needs are immediate, consider seeding and planting this spring – but you’d better do so quickly and expect challenges. Even IF you can get a good stand of brome this spring, it is unlikely the reseeded area will contribute significantly to the farm’s production this summer.

Seed prices have been above normal this spring, so factor that in to your budget as well. Be cautious about herbicide carryover issues when seeding as well. NOTE: spring seeded brome generally does not far as well as fall seeded brome.
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K-State Research and Extension

Full stop, now a hard crop for beef graziers. As most of the hay-harvested hay has been lost, it is time to consider new planting. Some of these fields were irrigated with inorganic water or rainwater, while the rest were using rainfall or groundwater. The various soil types and water sources are ideal for growing various crops. In a wet, rainy year, these fields are dry and ready to be harvested. However, some of them are significantly damaged and growers will need to decide on the best course of action.

In the field, growers must control weeds in the spring, but not too soon, as helios may kill the crop. Controlling spring weeds will be critical for successful establishment of new crops. Use tillage or non-selective herbicides to control weeds in the fall. These residues will be a critical component of the establishment of the next crop. Spring injury can be caused by hard freezes or severe frosts. It is important to control these weeds in newly established perennial grasses. Herbicides are limited in controlling helios in early spring. Meaning it is non-toxic residues that could be considered to reduce weed emergence and prevent seed and seedling damage during establishment.

On the other hand, if some of the damaged fields, growers could wait to see if the crop will come back. In this case, controlling weeds during the spring and summer will be critical. Helios control is used in established grain crops and can be used in fields. Care should be taken to observe plant growth intervals that may interfere with establishment of fall seeding or planting.

Table 1. Herbicides labeled for use in smooth bromegrass. Consult label for appropriate rate and adjacent information.

<table>
<thead>
<tr>
<th>Herbicide</th>
<th>Weed control</th>
<th>Used in establishment</th>
<th>Plant-back interval</th>
<th>Suppression expected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dicamba</td>
<td>Broadleaf</td>
<td>On or before leaf stage</td>
<td>36 days</td>
<td>Yes</td>
</tr>
<tr>
<td>Glyphosate</td>
<td>Broadleaf</td>
<td>On or before leaf stage</td>
<td>36 days</td>
<td>Yes</td>
</tr>
<tr>
<td>Orthoset</td>
<td>Broadleaf</td>
<td>On or before leaf stage</td>
<td>36 days</td>
<td>Yes</td>
</tr>
<tr>
<td>Clarity</td>
<td>Broadleaf</td>
<td>On or before leaf stage</td>
<td>36 days</td>
<td>Yes</td>
</tr>
<tr>
<td>Controly</td>
<td>Broadleaf</td>
<td>On or before leaf stage</td>
<td>36 days</td>
<td>Yes</td>
</tr>
<tr>
<td>Extol</td>
<td>Broadleaf</td>
<td>On or before leaf stage</td>
<td>36 days</td>
<td>Yes</td>
</tr>
<tr>
<td>Parate</td>
<td>Broadleaf</td>
<td>On or before leaf stage</td>
<td>36 days</td>
<td>Yes</td>
</tr>
<tr>
<td>Grammar</td>
<td>Broadleaf</td>
<td>On or before leaf stage</td>
<td>36 days</td>
<td>Yes</td>
</tr>
<tr>
<td>Plastun</td>
<td>Broadleaf</td>
<td>On or before leaf stage</td>
<td>36 days</td>
<td>Yes</td>
</tr>
<tr>
<td>Rangez</td>
<td>Broadleaf</td>
<td>On or before leaf stage</td>
<td>36 days</td>
<td>Yes</td>
</tr>
<tr>
<td>Mayz</td>
<td>Broadleaf</td>
<td>On or before leaf stage</td>
<td>36 days</td>
<td>Yes</td>
</tr>
<tr>
<td>Trexion</td>
<td>Broadleaf</td>
<td>On or before leaf stage</td>
<td>36 days</td>
<td>Yes</td>
</tr>
<tr>
<td>Tekton</td>
<td>Broadleaf</td>
<td>On or before leaf stage</td>
<td>36 days</td>
<td>Yes</td>
</tr>
</tbody>
</table>

The use of these names is for clarity to readers and does not imply endorsement of a particular product; nor does exclusion imply non-inclusion. Approximate application rates are noted below the label. Application instructions for herbicides may vary. Refer to the label for the complete information.

South Customers, Weed Management Specialist.
If reseeding right now isn’t an option but you still have forage needs – and concerns about how to meet them, you might fit in to this category.

Alternative forages can be a good option. Check out these three links for different options:
- Midwest Cover Crops Council selector tool: https://mccc.msu.edu/covercroptool/ (has a nice interface to allow you to explore information about different crops as well)

CAUTION: while annual and perennial forage crops can exist together in the same stand, in many cases one crop will try to dominate over the other. A thick/healthy perennial crop stand likely has first priority when it comes to resources (light/moisture/fertility), thus inhibiting establishment of the annual crop. A struggling perennial crop stand may allow for establishment of the annual crop, but could potentially do so at the expense of the perennial crop. It’s a delicate balance we sometimes have a hard time managing to encourage perennial crop persistence for the long term vs. annual crop production in the short term.
IF your forage needs can be met elsewhere, it would be nice to be able to make an evaluation after allowing for a recovery time period and determining input costs. Unfortunately, it will also delay any ‘restart’.

**Three Options...**

- Needs are long term and enterprise profitability can be maintained without maximum production
  - Procedure:
    - Monitor brome through spring
      - University of Illinois: if groundcover is 50% or less, renovate
    - Evaluate options for current stand:
      - Return to brome production
      - Convert to native grass production
      - Other?
  - Pros:
    - Better long term decision making process
    - Allows flexibility for managing input cost challenges
  - Cons:
    - No production = no revenue
    - ‘Recovery’ is delayed
    - There are no guarantees!
Plant Growth & Development: Cool Season Grasses

• Cool vs. Warm Season
  – When plants reach certain temperatures, they begin to grow
    • C3 species are cool season plants, growing well when temperatures are in the 40’s through 75 degrees F.
    • C4 species are warm season plants, growing well when temperatures are from 70 – 95 degrees F

A little about plant growth and development, since managing that process will be what helps bring stands back in to production the fastest.

Cool season grasses will be greening up soon!
We’re trying to encourage photosynthesis – and that in some cases means we need to provide rest for the plant to do its thing.
Vegetative growth notes...

- Chlorophyll development is rapid – but may not meet plant needs, requiring energy ‘draws’ from the plant crown until 2-3 leaves are formed***
- Leaves have a definite life span. Peak photosynthesis occurs when fully expanded, declining as they age until they can no longer support themselves and they die.

It’s going to take time to replenish root systems from plants that may start with a weakened system. Rest will be key to allow plants to produce the energy they need.
Ignoring roots OR leave can be an issue causing detrimental effects on the stand!

More leaf area in the early season = a faster growth rate providing plants the opportunity to store energy

Plants begin growth in the spring from dormant crown buds from carbohydrate reserves stored in the roots and crowns – the previous season.
- More energy = strong growth over a longer period
- Spring growth can be as much as two weeks earlier when plants are vigorous.
Where we’re headed...

• Ahead of greenup:
  – Evaluate stands for potential injury using methods above
  – Estimate what your stand may or may not be able to do
  – Evaluate past practices we have some control over:
    • Harvest Timing
    • Fertility
    • Harvest Height
    • Armyworm Feeding Level?
IF fertility is an issue, stands CAN benefit from a good fertility program. What does that look like?

**Fertility**

- **Brome Crop Fertilizer Removal Rates (# actual nutrient/T of yield):**
  - N: 30# (Urea is around $0.90-1.00 today/Ammonium Nitrate is around $1.10)
  - P: 12# (18-46-0 is running around $.90 for the P + N component)
  - K: 40# ($0.70/# of actual K)
- **Soil test if at all possible**
  - 15-20 cores/subsample
- **Apply in a timely manner (late summer/fall for P/K when possible)**
- **K-State N response data (nearly 100 experiments), the average yield for unfertilized cool season grass was 1.35 tons of hay per acre**
The chart on the right is for crop production, but it does show the probability that we’ll see responses when soil test levels are low (usually 10 ppm and below)
Do NOT skimp on a fertility program, but it likely won’t be a silver bullet. The non-fertilized area on the left looks pretty much the same as the one on the right with 40# of P last fall. It’s not a quick fix, for sure...
Late cutting + low cutting heights essentially removes almost all of our green leaf area. When you do so, you stop growth for almost two weeks. If that puts you in a hotter/dryer recovery window, you may be disappointed in how slowly the stand recovers – an how much damage it can handle.
The spring outlook isn’t terribly positive right now. Moisture may be close to normal, but we do look to be warmer than normal.

Check out the link above for Missouri’s armyworm monitoring sites.
Final Thoughts...

- Start stand evaluations soon.
  - Include a whole farm forage inventory
  - Optimize production from other forage stands when possible
  - Dig up plants to evaluate roots
- Eliminate other management factors that could damage the stand as well.
  - Damage cannot be eliminated but a well managed stand will withstand a lot
- Scout early and often for armyworms and know your options.

<table>
<thead>
<tr>
<th>Treatment/Product Name</th>
<th>19 Sep (7 DAT)</th>
<th>26 Sep (14 DAT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fastac CS XL @ 2.4 fl oz/a</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Besiege XL @ 8.0 fl oz/a</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Stallion @ 6.0 fl oz/a</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Grizzly Z @ 2.5 fl oz/a</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Lorsban 4E @ 1.5 pt/a</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Untreated</td>
<td>25</td>
<td>26</td>
</tr>
<tr>
<td>Untreated</td>
<td>18</td>
<td>20</td>
</tr>
</tbody>
</table>

No. of armyworms/larvae/ft²/total per 4 reps

The chart at right shows multiple products and their effectiveness. Killing armyworms is not generally a problem with most products when applied in a timely manner with plenty of water as a carrier when larvae are small. All tend to ‘hold’ for at least a couple of weeks as well. Timing is generally every bit as important as product and most products (IF labelled can provide adequate control).

NOTE: ALWAYS read and follow label directions and make sure products are labeled! Chlorpyrifos containing products (like Lorsban) are increasingly restricted and will likely no longer be available for application.
Contact:
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(785) 364-4125/(785) 863-2212/(785) 336-2184 or dhallauer@ksu.edu

THANK YOU FOR ATTENDING!