ALFALFA MANAGEMENT

Insects and diseases

Dr. Romulo Lollato
Extension Wheat Specialist
Alfalfa weevil life cycle

**Adult:**
Light brown snout beetle
Spring, early summer, fall

**Larvae:**
Small, light green worm
Large white central stripe
Smaller side stripes
Black head

**Laying eggs**
Fall and spring
Yellow at first
Orange-yellow

**Pupating in cocoon**
10-12 days

Feed until
~750°F GDD
(3-4 weeks)

300°F GDD
(~180 °F from January 1st?)
Alfalfa weevil life cycle

- Overwintering adults
- Eggs laying
- Larvae
- Pupae
- Adults dormant
- Adults feed, mate, seek shelter

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
What does this look like in Kansas (Osborne)?

- **Base temperature = 48°F**
- **1st instar - leaf pinholing**: Begin scouting
- **2nd and 3rd instars - defoliation**
- **3rd and 4th instars - defoliation**

Days of Year:
- April 5
- April 21
- May 29
- June 3

Cumulative GDD (°F, Tbase = 48°F)

Photo: Purdue Entom.
Economic damage from alfalfa weevil

- Larvae start feeding after hatching
- First, pinprick-sized holes in leaves and terminals (as growing tips unfold)

Photos: KSU Entom.
Economic damage from alfalfa weevil

- Feeding and defoliation become more obvious as larvae grow.
- Ragged, greyish-white appearance.
- Usually first cut is the one affected.
What happened in 2020?

$y = 0.2481x + 10.699$

$R^2 = 0.3575$
Alfalfa update – Smith Co (April 20)

Images: Romulo Lollato
Alfalfa in Rooks Co (early May 2020)

Images: Cody Miller
Alfalfa in Phillips Co (early May 2020)

Images: Cody Miller
What happened in 2020?

Cumulative GDD (°F, Tbase = 48°F)

- 1st instar - leaf pinholing
- 2nd and 3rd instars - defoliation
- 3rd and 4th instars - defoliation
- Begin scouting

Day of year

- 2020
- 2016
Recommendations – freeze damaged alfalfa

• Check for new growth:
  • From tips of stems: growing point unaffected
  • From crown buds: little regrowth from damaged stems

• Freeze-damaged alfalfa that is only 6-8 inches tall or less will be slower to regrow (plants are depleting carbohydrate reserves from the roots during the first 6-8 inches of growth).

• If mowing to encourage new growth (after 7-10 days and no regrowth), leave at least 2-3 inches of stubble to encourage regrowth

• Watch carefully for alfalfa weevil/pea aphids, and treat immediately (weevil larvae that survive in the leaf litter on the soil surface will start feeding on the new growth once the weather warms up).
Direct losses

- At 30-35 stems per square foot:
  - Each additional larvae will consume 170 pounds of hay in its life cycle

- Direct losses can be of 1+ ton per acre in the first cutting.

- Heavy infestations delay crop’s cycle (crop at pre-bud when should be in full bloom).

- Persistent weevil pressure greatly reduces stand life.

- Weevil feeding allows more light into canopy = more weeds.
Carryover losses

• Failure of plants to adequately recharge stored carbohydrates in the crown and root tissues prior to top-growth removal

• No stored energy to draw upon = slower regrowth

• Losses to subsequent cuts even in the absence of other stresses:
  • 2\textsuperscript{nd} cut: 9/10 ton/acre
  • 3\textsuperscript{rd} cut: 6/10 ton/acre
  • 4\textsuperscript{th} cut: ¼ ton/acre

KSU MF918
Cutting Mgt. for Winter Survival

Cut about 2 inches above soil surface so axillary buds are preserved.

Avoid short (<28 days) cutting intervals.

Last cut prior to dormancy should leave 8-12 in stubble (or 4-6 weeks of growth) before the killing freeze for root reserve replenishment.

Adequate K levels increase chances of winter survival.

Source: Lollato and Min, 2017.
FERTILITY MANAGEMENT

High nutrient removal (3-5 cuts/year)

Responsive to lime, $P_2O_5$ and $K_2O$

Soil test prior to planting (4-6 years investment)!!

$pH$ must be $> 6.5$

PHOSPHORUS MANAGEMENT

Broadcast pre-plant or in-furrow (no more than total 10 lbs N + K with seed).

Broadcast existing stands fall or early spring (roots near surface).

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<th>Area of state</th>
<th>Very low (0-5)</th>
<th>Low (6-12)</th>
<th>Medium (13-25)</th>
<th>High (26-50)</th>
<th>Very high (&gt;50)</th>
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POTASSIUM MANAGEMENT

High removal by the crop (60 lbs/ac per ton forage/ac)

High K levels in soils – need to soil test.

Broadcast pre-plant or existing stands fall or early spring.

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SULFUR MANAGEMENT

Take home: 2020 freeze

• Many growers did not control weevils due to:
  (i) unsure about yield potential after freeze
  (ii) timing “close to” termination of feed window (mid May)

• Potential for:
  (i) direct effects (reduction of last year’s yield)
  (ii) carryover losses (reduction of subsequent year’s yields)

• Recommendations: reduce other potential stresses to the crop
  (i) proper fertility,
  (ii) proper cutting management
QUESTIONS?

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