UNIVERSITY OF WYOMING

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Interseeding Legumes in Hay and Pasture

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- Can reduce increase productivity and fertilizer needs;
- Establishment and maintenance requires commitment to intensive management.

Establishment of legumes in existing grass

- Control weeds before planting legumes;
- Clip or graze close to ground to set grasses back;
- Plant with sod drill at < ¾" depth. Broadcast/overseeding has a high chance of failure in Wyoming;
- Plant in early spring (best) or summer, before August, for ample establishment time;
- No grazing for at least 5-6 weeks;
- Clip grass 8-10 inches high to prevent crowding out seedlings.

Species and interseeding rates

(Double rates for broadcasting)

Alfalfa	8
Sweet clover	8
Birdsfoot trefoil	6
Alfalfa + Red clover	6+3
B. trefoil + Red clover	3+3
Red clover + Orchardgrass	5+3
B. trefoil + Orchardgrass	4+2
Alfalfa + Orchardgrass	6+3
Alfalfa + Bromegrass	6+8
Alf. + Brome + Orchard.	6+6+2

Maintaining established mixed stands

Grazing management

- Rotational grazing with good distribution;
- Graze close (~3 inches) and remove;
- Follow with irrigation;
- Strive to keep grass in vegetative stage;
- Paddock system with max. 600-800 feet to water is best for distribution.

Nutrient management

- Hay harvest removes large amounts of nutrients so requires annual testing and fertilizer;
- Grazing recycles ~90 percent of nutrients so only occasional testing and fertilizer is required;
- Adequate to high levels of potassium and phosphorus are especially important for establishment and maintenance of legumes.

Nitrogen

- 50 percent or greater stand of legumes fixes all the N required;
- Fertilize based on potential yield, **and remember, using N fertilizer will eliminate legume component**;
- **For 100 percent grass hay & pasture, production responds to N fertilizer:**
    - Best N source: UAN applied with spoke-wheel injector;
    - Urea: must apply >= ¼ inch of water from sprinkler within 3 days;
    - Ammonium sulfate: expensive, but stable dry product, problems suspected in Laramie;
    - For pasture, test soil every 2-3 years;
        - If N called for, split into two or three separate applications;
        - Apply 1/3 to 1/2 in early spring, 1/3 to 1/2 in June, and the remainder in late August.
        - Schedule mid- and late-season nitrogen applications to coincide with irrigation or rainfall events.
        - For hay-pasture systems, apply 2/3 of the nitrogen in early spring and 1/3 after the hay crop is removed to stimulate regrowth for grazing.

Phosphorus

- Most often deficient, especially in high-yield management;
- Stimulates nodule production and N fixation;
- Soil test crucial; symptoms difficult to detect;
- Sample >6 months prior to planting: takes time;
- Test soil at least every 2 or 3 years (see UW ext pub on sampling);
- Apply P to total about 10 lbs/ac/ton of expected yield;
- We recommend annual applications, but USU claims best results from applications every other year;
- Band preplant P for better root access; but broadcast just as effective on established stands;
- On established stands apply in fall or early spring, but avoid soft soils;
- Fall best for furrow-irrigated stands;
- Source does not matter: choose by availability, ease of application, and price per unit P2O5;
- Split application beneficial only for high-yield, long growing season (not Wyoming).

Potassium

- Can be deficient on sandy soils, irrigation with clean water low in K, and long-term, high yield production;
  - If need is determined annual applications are necessary;
  - Several sources available; choose same as P.

Sulfur

- Occasionally deficient on sandy low OM soils with clean, low-S irrigation water;
  - Sulfate-sulfur soil test < 8 ppm indicates need;
  - Utah State recommends: 50 lbs SO_4-S as ammonium sulfate, potassium sulfate, or gypsum plus 100 lbs/ac of elemental S to correct deficiencies for 2 to 3 years.

Micronutrients

- Deficiencies sometimes occur: apply according to soil test recommendations;
- Liquid forms work well;
- Fe chlorosis can occur in early spring but often disappears with warmer temperatures.

Other fertilizer considerations

- Fertilize right after harvest, before regrowth, avoid fertilizer contact with wet foliage;
- Topdress after first cutting to improve regrowth; after last cutting to improve winter hardiness;
- Avoid soft soils, like in early spring, due to compaction and physical damage to root crowns;
- Split application if using > 500 lb/a to avoid salt damage;
- Base source choice on price per unit; they don't perform differently;
- Don't use foliar spray for mod-high rates of macro nutrients: causes salt damage and uptake is no better than soil application. Great for micronutrients though.

Applying manure to irrigated alfalfa & grass

- Excellent source of P, K and micronutrients if applied to avoid salt damage, but N favors grass & weeds, reduces fixation, and shortens life of legume component;
- Rates should not exceed 3000 to 5000 gal/ac liquid or 10 t/ac dry in any one application;
- Apply uniformly and break up large chunks;
- Three timing considerations:
  - Before Establishment: >6 months prior; avoid seed contact;
  - On established stands: ASAP after harvest, before regrowth to avoid salt damage, and on dry soil to avoid compaction and crown damage;
  - Before plow down for next crop: light application because, combined with N fixed by alfalfa, will create excess.
- Best to apply to grass stands or mixed grass-alfalfa because grass will respond dramatically; again, ASAP after harvest to avoid salt damage;
- Avoid ammonia losses by avoiding warm, windy days to apply;