

## Central Washington Animal Agriculture Team



Fact Sheet # 1002-2005

### Oat Hay and Straw

Steve Fransen, WSU Extension Forage Specialist  
Tip Hudson, WSU Extension Educator

The annual cereal crop, common oat (*Avena sativa*, a hexaploid crop with  $n=42$  chromosomes; hull colors ranging from white to black), is widely grown as grain for horses and young cattle and hay for many livestock classes. Straw from oats is commonly baled after combining ripe grain and used for bedding or mixing with other feedstuffs. Red oats or Southern oats (*Avena byzantina*, a hexaploid crop with  $n=42$  chromosomes; hull color typically red) is more commonly used for pasture and hay throughout the world as it is more heat and drought tolerant. Varieties of red oats are normally leafier than common oats. Most northern state oat breeding programs in the US are focused on developing spring-type oats. Winter habit common oat breeding has historically been done in the Pacific Northwest and in state such as Kentucky and Tennessee. Active red oat breeding programs have historically been located in Texas and California. Oat breeding per se has declined in the US in the past decade. Most oat breeding programs are focused on increased grain yield rather than pasture or hay yield.

#### **Oat Growth and Development**

Oats are a long day plant, meaning they require 12+ hours of daylight to flower. Growing points in the crown of the oat plant biochemically "sense" increasing daylength

and respond by allowing head development when an extended period of increasing daylight has occurred. In a drought year, plant spring oats early. Moist, spring soils where soil temperatures range from  $37^{\circ}$  to  $41^{\circ}$  F will permit rapid oat seed germination and emergence. Check soil temperatures at depths of 1 to 3 inches across the field prior to planting to ensure rapid germination. Germinating seeds and seedlings are tolerant to low temperatures and will withstand spring frosts to  $26^{\circ}$  F air temperature. Each 3 to 4 day delay in spring oat planting will delay crop maturity about 1 day at harvest time. When planting, use a grain drill and use certified, cleaned, high germinating oat seed at 1 to 2 bushels per acre (the goal is 25 to 30 seeds per  $\text{ft}^2$ ; varieties differ in seed weigh, ask dealer or count and weigh 1000 seeds to determine true planting rate) planted at about a 1 inch depth. Shallower planting will ensure more rapid emergence and early seedling establishment in a drought year. Broadcast seeding with shallow incorporation can also be successful if a higher seeding rate (30-40 seeds per  $\text{ft}^2$ ) is used. Depending on oat variety selected and spring weather conditions, oats should reach soft-dough stage within 8 to 12 weeks after emergence. It takes about another 3 to 4 weeks to reach grain ripening stage for combining. Hot, droughty weather conditions will shorten the

maturity timeline while cool, wet conditions will lengthen it.

### ***Fertilization Management***

Take a soil test on land to be planted to oats. We recommend P and K be banded with the grain drill at planting. Nitrogen should be applied to your expected yield in a water short year. Remember, excess nitrogen may cause unwanted toxic nitrate hay or straw. In a drought year, the germinating oat seed needs nutrition as fast as possible. Delays in early growth are much like delays in timely planting – delayed time to maturity and more susceptible to hot temperatures and drying winds. Oat flowers will ‘blast’ or abort after heading if temperatures are high, thereby reducing grain yields.

### ***Harvesting Oat Hay and Straw***

Boot stage oats, like most grasses and cereal grains, will have higher overall forage quality than if harvesting is delayed to soft dough. Hay yield will be lower for boot compared to soft dough stage growth. The additional grain produced at soft dough will not make up for the loss of leaves and changes in stem quality compared to boot stage oat hay. Oat straw after grain harvest is often baled for bedding. In a drought year, we recommend both oat hay and baled straw be tested for nitrates. Toxic nitrates will accumulate in highest concentrations in oat stems followed by the leaves with very little nitrate in the grain. Within the stems, nitrates will be highest near the soil surface. If you suspect nitrates have accumulated, which likely could occur in a drought year, consider cutting the crop at a higher level (leaving more stubble in the field) to reduce the potential hazard of nitrate poisoning. In stalls or bedding areas, livestock may inadvertently eat the oat straw. When harvesting oat grain, raise the combine header leaving in the field as much of the high nitrate oat straw as possible. When testing for plant nitrates, use a standard hay sampling probe, collect about 20 cores then send hay and straw samples to a commercial laboratory for wet-lab testing.

Forage nitrates are commonly reported as nitrate, nitrate-nitrogen, or potassium nitrate. It is possible a laboratory will report nitrate as sodium nitrate so be sure to ask the laboratory how the results will be reported.

### ***Oat Pest Problems***

Oats are susceptible to both leaf and stem rust (fungus) diseases. In hay production, leaf rust will most likely lower oat hay quality as infected leaves will die and fall from the plant as the rust consumes valuable nutrients stored in the leaf tissue. Much research has been conducted to develop more disease resistant varieties. Oats are also susceptible to barley yellow dwarf and smut. Weeds should be controlled early in the oat crop. Weeds will consume both soil water and nutrients required by the oat crop to reach maturity. Some annual, broadleaved weeds are also nitrate accumulators and their presence will increase overall nitrate problems. Heavier oat planting rates may not be the answer because with limited irrigation water, additional oat seeds will demand more inputs than likely available. The smallest oat seedlings will eventually die through self-thinning but some may survive and delay the development of the crop in a water short year.

### ***Pasturing Oats***

Winter or red oats are commonly grown when oats are used for pasture. Winter oats are much less winter hardy than winter wheat or cereal rye. Red oats are leafier than common oats but if pasturing either oat type, delay grazing until oat plants are well established or when 6 to 8” tall. Livestock can easily pull up the small oat seedlings if grazing occurs before the crop is established. Use a rotational system of grazing to move livestock before the oat is grazed to 3 to 4”. The goal is not to graze the primary (first) node off above the soil surface as growth will stop if the growing point is removed. Depending on weather and irrigation water, oats will regrow if proper stubble height is maintained and

produce one or more grazing cycles. Grazing livestock should be monitored closely for nitrate poisoning. Symptoms of nitrate poisoning include a rapid and weak pulse, increased and painful breathing, staggering, eye whites and tongue turn blue, reduced feed intake, chocolate brown blood and finally death. Additionally, monitor livestock for grass tetany and milk fever as both conditions are possible when grazing lush, rapid growing oat pasture.