DROUGHT ADVISORY

EM4918E

Oat Hay and Straw

The annual cereal crop common oat (*Avena sativa*, a hexaploid crop with n=42 chromosomes; hull colors ranging from white to black) is a widely grown grain for horses and young cattle. It is also used as hay for many livestock classes. After harvesting the grain, straw from oats is commonly baled and used for bedding or mixing with other feedstuff. 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.

Over the past decade, oat breeding has declined in the US. 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 states such as Kentucky and Tennessee. Active red oat breeding programs have historically been located in Texas and California. 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, requiring 12 or more hours of daylight to flower. Growing points in the crown of the oat plant biochemically "sense" increasing day length and respond by allowing head development after an extended period of increasing daylight.

In a drought year, plant spring oats early. Moist, spring soils with soil temperatures ranging from 37° to 41° F will permit rapid oat seed germination and emergence. To ensure rapid germination, check soil temperatures at depths of one to three inches across the field prior to planting. Germinating seeds and seedlings are tolerant to low temperatures and will withstand spring frosts to 26° F air temperature. Each three- to four-day delay in spring oat planting will delay crop maturity about one day at harvest time.

Use a grain drill to plant certified, cleaned, high germinating oat seed at a rate of one to two bushels per acre at a depth of about one inch. Aim for 25 to 30 seeds per square foot ; varieties differ in seed weigh, so ask your dealer or count and weigh 1,000 seeds to determine the true planting rate. 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 is used (30–40 seeds per ft^2).

Oats should reach soft-dough stage within eight to twelve weeks after emergence, depending on the variety and spring weather conditions. In another three to four weeks the grain will be ripe enough to combine. Hot, droughty weather conditions will shorten the maturity timeline while cool, wet conditions will lengthen it.

Fertilization Management

Use a soil test to be determine fertility needs. Phosphorus (P) and potassium (K) should be banded with the grain drill at planting. Nitrogen needs should be based on your expected yield in a short water year. Remember, excess nitrogen may cause toxic nitrate levels in the hay or straw. In a drought year, germinating oat seed needs nutrition as fast as possible. Delays in early growth are much like delays in timely planting, resulting in later maturity and higher susceptibility 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

Like most grasses and cereal grains, oat hay harvested in the boot stage will have higher overall forage quality but lower yield than if harvesting is delayed until soft dough. Even though more grain is produced by harvesting at the soft dough stage, deterioration in leaf and stem quality of the oat hay will result in an

overall net quality loss. Oat straw remaining 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 accumulate in highest concentrations in oat stems, followed by the leaves. Very little nitrate accumulates in the grain. Within the stems, nitrates will be highest near the soil surface. If you suspect nitrates have accumulated, a likely occurrence in a drought year, consider leaving more stubble in the field by cutting the crop at a higher level. In stalls or bedding areas, livestock may inadvertently eat the oat straw. When harvesting oat grain, raise the combine header and leave as much of the high nitrate oat straw as possible in the field.

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. Nitrates are sometimes reported 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. Infected leaves 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. When selecting an oat variety, ask the seed producer about its disease resistant characteristics. 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. Some annual broadleaved weeds are also nitrate accumulators, so their presence will increase overall nitrate problems. Heavier oat planting rates may not be helpful because the additional seedlings will increase water demand. The smallest oat seedlings will eventually die through self-thinning but the surviving seedlings may delay development of the crop in a water-short year.

Pasturing Oats

Winter or red oats are commonly grown for pasture. Winter oats are much less winter hardy than winter wheat or cereal rye. Red oats are leafier than common oats but if either type is used for pasture, delay grazing until oat plants are six to eight inches tall. Livestock will uproot small oat seedlings if grazing occurs before the crop is established. Use rotational grazing to move livestock before the crop is grazed down to a height of three or four inches. The goal is to leave the primary (first) node intact, as growth will stop if the growing point is removed. Depending on weather and irrigation conditions, oats will regrow if proper stubble height is maintained.

Grazing livestock should be monitored closely for nitrate poisoning. Symptoms of nitrate poisoning include a rapid and weak pulse, increased and painful breathing, staggering, blue tongues and whites of eyes, 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, rapidly growing oat pasture.

Information on soil moisture monitoring and crop evapotranspiration from Washington's Public Agricultural Weather Stations (PAWS) and Washington Irrigation Scheduling Expert (WISE) are available on the Scientific Irrigation Scheduling (SIS): web page
http://sis.prosser.wsu.edu

Drought advisories and other Washington State University Extension Bulletins are available online at
http://pubs.wsu.edu
Type "drought" in the search box for downloadable files.

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