Pea/Oat Mixtures for Forage
by Vance Owens, SDSU and Patrick Carr, NDSU

Many producers sow field peas with oats or another small grain as an annual forage crop. The harvested forage is generally higher in quality and more palatable to animals than oats grown alone. Some producers plant a mixture of oats and peas with alfalfa during establishment as well, particularly in Wisconsin and eastern Minnesota. This article will focus on pea/oat mixtures grown without alfalfa.

In several studies conducted throughout the upper midwest and great plains states, researchers have consistently noted a 3 to 5 point increase in crude protein (CP), a 5 to 8 point decrease in neutral detergent fiber (NDF), and a 1 to 3 point reduction in acid detergent fiber (ADF) when peas were mixed with oats. In most instances, yields of pea/oat mixtures and oats grown alone have been similar. Several key management practices should be followed when considering a pea/oat mixture for forage. Although this article deals primarily with oats, management practices for other small grains are similar.

**Variety Selection**
Selection of an appropriate small grain species and variety is important to yield and quality management. Varieties that are medium to late-heading and medium to tall in height like Morton, Leonard, and Troy work very well in combinations with peas. Taller, later maturing oat cultivars improve yield but tend to be slightly lower in quality than short, early heading varieties. North Dakota is one of the few states that maintain small grain forage yield trials, but information regarding height and heading dates is available from almost all states.

A number of field pea cultivars are also available. Common forage varieties include Arvika and Trapper among others. As with oats, pea maturity date varies by variety; thus, a pea variety should be chosen that most closely matches the maturity and height of the desired small grain.

**Planting Date**
Oats and peas are both cool-season species which grow best during the spring and early summer months. With this in mind, seed should be planted early in the spring to take advantage of the cool weather. Establishment success, along with forage yield and quality, may be sacrificed if planted too late, particularly if planting is delayed to late May or June.

**Fertility**
Soil nitrogen should test at least at the medium level, especially to improve oat yields. Peas are able to fix nitrogen from the atmosphere if successful nodulation takes place. To ensure that nitrogen fixation is maximized peas should be inoculated with the correct species of bacteria (*Rhizobium leguminosarum*). The inoculant used for alfalfa is not the same one needed for peas. In western North Dakota, intercropping pea and oats enhanced yield (and quality) more under low soil-N conditions than under medium to high soil-N conditions. The pea component also can improve quality (based on higher CP concentrations) under even high N conditions, but the cereal crop seems to be the ‘driver’ in terms of yield.

**Seeding Rate**
Various recommendations have been made for pea/oat mixtures, many of which are based on pounds of seed per acre or on a specific proportion of pea to oats, again based on pounds. Because pea and oat seed size can vary significantly, seeding rate must be calculated based on the desired number of pure live seed per square foot (PLS/ft) or pure live seed per acre (PLS/acre) rather than simply on a pound per acre basis. In general, research results demonstrate that oats should be seeded at about 15 PLS/ft (653,000 PLS/acre) and peas at about 5 to 10 PLS/ft (218,000 to 435,000 PLS/acre). Trapper and Arvika peas were used in a study in South Dakota in 1999. Seed size of the two varieties differed dramatically; one pound of Trapper seed consisted of 4437 seeds while one pound of Arvika was composed of only 2878 seeds. Planting both varieties at the same pound per acre rate would have resulted in 35% fewer Arvika seeds per acre.

**Harvest Timing and Method**
As with any forage crop, there is a tradeoff between yield and quality. To achieve high quality forage, pea/oats should be harvested when oats are at the late-boot to early-heading stage of maturity and peas are beginning to blossom. Yields will generally range from 1 to 2 tons per acre and protein from 15 to 20% at this stage of maturity, depending on the proportion of peas and oats in the mix. Delaying harvest until oats are at the soft dough stage of maturity and peas are undergoing pod development will increase yields but decrease quality. At this stage of maturity, yields will generally range from 1.5 to 3.5 tons per acre and protein from 10 to 15%. Based on work in North and South Dakota, delaying harvest to a later stage of maturity will increase yields by 1.0 to 1.5 tons, but reduce CP by 3 to 6 points and increase NDF by 5 to 7 points.
Pea/oat mixtures work very well for silage, but are more difficult in a hay situation because peas are difficult to dry. For this reason, a crimper should be used to cut pea/oat mixtures, particularly if the crop is to be made into hay.

**Further Information**
Height and maturity of many oat cultivars is provided on the websites of most universities. See the following sites for further information regarding this and other forage related topics.

**North Dakota**: [http://www.ag.ndsu.nodak.edu](http://www.ag.ndsu.nodak.edu). Click on the Agriculture, Natural Resources icon and go to the Variety Trial Performance in the Crop Production link.


**Wisconsin**: [http://www.uwex.edu/ces/torage/alf03.htm](http://www.uwex.edu/ces/torage/alf03.htm) - alfalfa, clover, grasses