

## Oats and Peas as Alternative Forage

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Perennial forages provide most of the livestock feed in western South Dakota, a major livestock producing region. Drought frequency in the past few years has resulted in shortage of livestock feed, driving a high demand for alternative sources of forages. Annual crops can be of great value in developing a year-round forage system. They can be used to provide early grazing before perennials are available, extend the grazing period or increase hay and silage production.

Many producers plant 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. Research shows that oats grown with peas can provide excellent tonnage and high quality forage. Including peas in the mixture generally increases crude protein (CP) by 2 to 4 percentage units. In addition, neutral detergent fiber (NDF) is substantially lower and acid detergent fiber (ADF) is slightly lower when peas are combined with oats compared to oats grown alone. This article will focus on pea/oat mixtures grown without alfalfa.

Table 1 shows the results of studies conducted at the Northeast Research Station north of Watertown in 1998. 'Troy' oats were planted alone or with 'Trapper' peas on 23 April 1998 and harvested early (22 June 1998) or late (10 July 1998). Oats were at the late-boot to early-milk and peas at early-to mid-blossom for the early harvest. On the late harvest date, oats were at the soft- to mid-dough stage of maturity whereas peas had undergone significant pod development. Because pea and oat seed size can vary significantly, seeding rate was calculated based on desired number of pure live seed per square foot (PLS/ft<sup>2</sup>) rather than simply on a pound per acre basis. In general, data suggest planting oats at about 15 PLS/ft<sup>2</sup> and peas at approximately 8 PLS/ft<sup>2</sup>.

In 2005 at Wall in Pennington County, SD, 'Jerry' oats, 'Haybet' barley, triticale (unknown variety) and annual ryegrass were compared to mixtures with field 'Arvika' pea for forage yield/quality. Plots were planted on 6 April 2005. Full seeding rates were 90 lb/acre for 'Arvika' peas, 64 lb/acre for oat and barley, 72 lb/acre for triticale and 20 lb/acre for annual ryegrass. Plots were harvested when oats were at the soft-dough stage of development (Table 2). The mixture of oat and pea resulted in crude protein improvement of 3.5% on average compared with straight small grain cereal. However, annual ryegrass had a higher crude protein concentration (17.3% vs. 15.7%) compared with oat/pea mixture. Although an oat/pea mixture resulted in superior forage quality, it was also associated with forage dry matter yields that were less than straight oats, probably due to competition between peas and oats in the mixture.

As with any forage crop, there is a trade-off 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 1-2 tons/acre and protein from 15-20% , 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 1.5-3.5 tons per acre and protein from 10-15%. Based on work in North and South Dakota, delaying harvest to a later stage of maturity will increase yields by 1.0-1.5 tons, but reduce CP by 3-6 points and increase NDF by 5-7 points.

Pea/oat mixtures work well for silage, but since peas are hard to dry, a crimper should be used if the crop is to be made into hay.

**Table 1.** Yield and quality of oats and pea/oat mixtures harvested on two dates at the Northeast Research Station west of South Shore, SD in 1998.

Forage Type & Harvest Timing	Yield (Ton/Acre)	CP (%)	NDF (%)	ADF (%)	RFV
<b>Early Harvest</b>					
Oats	2.0	15.5	53.6	30.0	117
Peas/oats	1.7	19.2	46.9	28.7	136
<b>Late Harvest</b>					
Oats	3.8	9.9	60.3	34.8	98
Peas/oats	3.3	13.8	53.2	32.8	114
<b>LSD (0.05)</b>	0.3	2.4	2.3	1.1	6

Entry	Yield (Ton/Acre)	Ash (%)	ADF (%)	NDF (%)	CP (%)	IVDMD (%)	RFV
Oat (Jerry)	3.2	9.9	35.5	59.3	13.0	63.2	96
Oat/Pea (60%/40%) mixture	3.1	10.5	34.2	54.4	15.7	66.3	106
Pea (Arvika)	1.8	9.6	30.0	37.2	25.5	72.0	164
Barley (Haybet)	3.8	8.3	36.8	59.0	10.9	63.2	95
Barley/Pea (60%/40%) mixture	3.2	9.3	36.1	57.3	13.0	64.0	99
Triticale	3.1	9.8	38.0	59.8	12.3	64.3	92
Triticale/Pea (60%/40%) mixture	2.8	10.3	35.5	56.6	15.7	68.1	101
Annual Rye Grass	1.8	11.0	35.7	57.5	17.3	63.8	99
Mean	2.8	9.8	35.3	55.1	15.4	66.5	106
LSD (0.05)	0.6	0.9	2.2	4.8	1.7	3.4	--
CV (%)	13.3	4.8	4.3	5.9	7.5	3.5	--