



Conservation Systems Research

Using a Black Oat Winter Cover Crop for the Lower Southeastern Coastal Plain

CONSERVATION SYSTEMS FACT SHEET NO. 01

United States
Department of
Agriculture

Agricultural
Research
Service

National Soil
Dynamics
Laboratory

Conservation
Systems
Research

Conservation
Systems
Fact
Sheet
No. 01

March 2005
rev. April 2016

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Black oat (*Avena strigosa*) is a cool season, winter annual grass that grows well in the Southeastern Coastal Plain. 'SoilSaver' black oat (*Avena strigosa* Schreb.) is a joint release between Auburn University and IAPAR (Institute of Agronomy of Paraná, Brazil). It was selected for increased cold tolerance by Auburn University and USDA-ARS researchers from a population of 'IAPAR-61-Ibiporá', a public variety released by IAPAR (Institute of Agronomy of Paraná, Brazil) and the Comissao Paranaense de Avaliacao de Forrageiras (Paranense Commission for Evaluation of Forages-CPAF).



Black oat residue

Yields

Black oat seeds have on average a thousand seed weight of 15 g and are light tan in color. Expected seed yields range from 800 to 1400 lb/acre. Black oat is intended for use as a cover crop and biomass yield is more important than seed yield. 'SoilSaver' black oat was compared to 'Wintergrazer 70' rye (*Secale cereale* L.) and 'GA Gore' wheat (*Triticum aestivum* L.) as a cover crop from 1994/95 - 1996/97 in a conservation tillage experiment in Headland, AL (Table 1). 'SoilSaver' black oat compared favorably to both these small grains in biomass production, with the exception of the 1995/96 season, when consecutive low temperatures of 15°F, 12°F, and 12°F on 4-6 February, respectively, killed the black oat in 1996*.

Pest Resistance

Black oat is moderately susceptible to leaf and stem rust and *Helminthosporium*. In studies in Paraná, Brazil, seed yield reductions were observed due to these diseases, but they did not interfere with forage production and capacity for soil coverage. For seed production, chemical control of insects and diseases as recommended for common oat (*Avena sativa* L.) should be practiced. In experiments in Rio Grande do Sul, southern Brazil, black oat reduced the population of *Helminthosporium sativum* propagules in a soybean rotation compared to wheat (Reis, et al., 1985).

'SoilSaver' black oat was also tested by the EMBRAPA National Wheat Research Center, Passo Fundo, Rio Grande do Sul, Brazil with ten other grass species, including

wheat, barley (*Hordeum vulgare* L.), fescue (*Festuca arundinacea* Schreb.), and ryegrass (*Lolium multiflorum* Lam.) for resistance to *Cochliobolus sativus* root rot and was found to be resistant (Diehl, 1983). A high resistance level to Barley Yellow Dwarf virus has been reported for black oat (Comeau, 1984). In a greenhouse study of 17 plant species suitable for use as cover crops, black oat was shown to be resistant to root-knot nematode *Meloidogyne javanica* (Antonio and Neumaier, 1986).

Cover Crop

Black oat should be adapted for use as a winter cover crop in the lower Coastal Plain; this includes USDA Plant Hardiness Zones 8b-10a. 'SoilSaver' has done well in fall plantings in Zone 8b, but was winter killed 1 year of 6 at some locations within this zone, dependent on planting date. Plantings of 'SoilSaver' north of this zone are not recommended due to insufficient cold hardiness and risk of winter kill. In the year fall planted oat was winter killed, a late winter (early February) planting yielded good biomass and ground cover for late planted cash crops.

Table 1. Dry matter (lb/A) of 'SoilSaver' black oat compared to winter cover crops at Headland, AL (Reeves et al., 2005).

Cover Crop	1995	1996	1997
rye	4579	5852	2532
black oat	4864	1175*	2474
wheat	4552	3900	1427
winter weeds	1259	779	689
LSD _{0.10}	857	531	521

For seed production, 250 viable seeds/m², about 40 lb/A drilled, is recommended. For use as a cover crop, 350 viable seeds m² or 50-70 lb/A is recommended. Recommended planting dates within a region are similar to common oat. If planted too early, it is more susceptible to winter kill and lodging. Black oat has several advantages as a cover crop. It tillers well, producing good soil coverage in relation to total biomass produced and suppresses broadleaf weeds extremely well (Pérez and Ormeño-Núñez, 1993). In a study at the Wiregrass substation, weed control in conservation tillage cotton (*Gossypium hirsutum* L.) averaged 34% with 'SoilSaver' black

oat compared to 26% for rye, 19% for wheat, and 16% with no cover crop. In USDA-ARS greenhouse studies, 'Soilsaver' black oat residues mixed with soil inhibited tap root elongation of both cotton and radish (*Raphanus sativa* L.) more than rye residues. However, in an accompanying field study, cotton lint yield averaged 107 lb/A more with black oat than with a rye cover crop (Bauer and Reeves, 1999). It maintains a narrower carbon to nitrogen (C:N) ratio than rye (Derpsch et al., 1985; Bauer and Reeves, 1999), which is important for N management in conservation systems.

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