



Common Oats

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Common oats (*Avena sativa*), a cool-season annual cereal, has gained popularity in Hawaii because of its ability to provide quick soil cover, suppress weeds, and increase soil organic matter at a very modest cost. Its tropical relative, the 'Black Oats' variety, will soon be released in the southern USA under the name 'SoilSaver' and already has a prominent place in some no-till systems and other sustainable agriculture systems in Brazil.

Characteristics

Common oats is an upright, annual grass that reaches a height of 2–5 ft (0.6–1.5 m). It has a fibrous root system. In Hawaii its growing cycle is approximately 60 days. Its seed is inexpensive and there are many regionally adapted varieties. Consult a seed distributor to choose a disease-resistant type.

Environmental requirements

Oats thrives in cool, moist climates on well drained soils, but this crop is adapted to many soil types. It tolerates soil pH levels from 5.5 to 7.0, but some varieties can tolerate soil pH as low as 4.5. It has a wider pH adaptability than wheat or barley, and it has a low lime requirement. In Hawaii, common oats can be grown year-round at elevations ranging from sea level to 4000 ft, according to the USDA Natural Resources Conservation Service (NRCS). The crop tolerates wet soils better than barley. It requires more moisture than other small-grain crops.

Cultivars

Common oats cultivars commonly recommended by the Hawaii NRCS include 'Newdak', 'Steele', 'Swan', and 'Valley.' CTAHR oats variety trials on Hawaii, Molokai,

Benefits provided by common oats

EXCELLENT for suppressing weeds due to rapid growth and establishment

VERY GOOD as a "catch crop" for taking up and storing excess N and providing erosion control

GOOD for increasing soil organic matter content to improve soil structure, for animal grazing systems, and for providing lasting residues for a following crop



TOLERATES low fertility soils

USE IN annual production systems with vegetables, herbs, cut flowers, other ornamentals, and root crops such as dryland taro

and Lanai suggest that 'Walken' and 'Coker' are promising in terms of vigorous growth, rapid soil cover, weed suppression, low plant height, and lack of flowering. CTAHR Cooperative Extension Service agents report using the rust-resistant cultivar 'Coker 234' successfully on Lanai. 'Cayuse' oats grew well at CTAHR's low-elevation Waimanalo Research Station on Oahu. Studies conducted with sugarcane in central Oahu also

showed that oats interplanted with sugarcane rows provided rapid soil cover and good weed control. Initial growth of the cover crop was much faster than the sugarcane growth, so the cover crop provided early soil protection from erosion. Forage oats were also used successfully for the protection of soils in abandoned pineapple fields in Lanai, where a planting of 1000 acres of oats showed that the crop can be successfully established with the winter rains, providing rapid and adequate ground cover by 30 days after seeding.

Establishment

Broadcast 110–140 lb pure live seed per acre (3.5–4.5 bu/acre), or drill 80–110 lb pure live seed per acre (2.5–3.5 bu/acre). Broadcast and cover or drill to a depth of ½–2 inches and disk lightly. If the soil is sufficiently moist, shallow seeding promotes rapid seedling emergence with reduced root rot disease.

Uses

Weed control

Common oats provides several alternative methods of weed control, reducing the need for chemical weed control. Oats germinate very quickly and are able to smother out emerging weed species. In addition, oats release allelopathic compounds, plant-made chemicals that hinder weed growth for several weeks. However, these same compounds can hinder the growth of subsequent crops such as lettuce, watercress, rice, wheat, and peas, so this allelopathic trait should be taken into consideration when planning the timing and sequence of a crop-rotation program on the farm. The allelopathic compounds tend to break down in about three weeks.

Soil improvement

Common oats produces about 2 tons/acre dry matter and takes up about 16 lb of nitrogen in each ton of dry matter (NRCS). Summer (June planting) fresh weight biomass yield at the Waimanalo Research Station were about 3700 lb/ac at 6 weeks after planting, harvested when the plants were 14 inches tall. A later planting (Sept.) in Waimanalo with a 3-month growing cycle resulted in fresh weight biomass yields of 5400 lb/ac with plants harvested when 13 inches tall.

The tissue N content of oats is about 1.2%. For an optimal rate of oats residue decomposition, apply 20 lb

of N for each ton of dry matter at plow-down. The addition of this N fertilizer will promote microbial activity and will also prevent the decomposing plant material from tying up nitrogen needed by the following crop. Alternatively, a mixed cover crop stand of oats and a legume can minimize potential problems of N immobilization after cover crop plow-down. To allow time for residue decomposition, allow 2–3 weeks after cover crop incorporation before planting the cash crop.

Incorporating oats into the soil also improves the soil “health” by improving the soil structure and tilth, which improves water infiltration. Most of this soil improvement will occur in the top soil layer. As the residues decompose, the organic matter additions also encourage the formation of a rich, beneficial microbial soil “food web.”

When planted at low densities, oats can also be used as a nurse crop for establishing slower growing legume cover crops. If it grows too vigorously, the oats crop can be mowed to allow better growth of the legume intercrop. The CTAHR research with oats on Lanai demonstrated its many potential uses as a forage, soil conservation alternative, and nurse crop to establish tropical grass pastures (with rainfed alfalfa) and hay fields (with green panic).

Management cautions

The allelopathic compounds that make oats an ideal crop for suppressing weeds may stunt the growth of a subsequent cash crop. Avoid planting lettuce, cress, or peas immediately after incorporating oats. Allow 3 weeks for the allelopathic compounds to decompose.

Pest problems

When grown for grain or forage, oats tends to have more insect problems (such as armyworms, grain aphids and mites, wireworms, cutworms, thrips, leafhoppers, grubs, and billbugs). Cultivars resistant to rust, smut, and blight have been developed; consult seed dealers for the latest information. Rust resistance may be a useful consideration in some areas of Hawaii.

Red and black oats

Red oats (*Avena bysantina*) is recommended by NRCS as a non-legume green manure. Establishment information and management features are very similar to com-

mon oats. Red oats have grown very well at the Waimanalo Research Station.

Black oats (*Avena strigosa*) is a tropical and subtropical annual cereal enjoying enormous popularity as a cover crop in conservation-tilled soybean in Brazil. Black oats produces large amounts of biomass, has allelopathic properties similar to common oats (can suppress weeds and crops for a few weeks), is somewhat resistant to root-knot nematode (*Meloidogyne javanica*), and is very rust resistant. It can also serve as a forage crop. Low-elevation field plantings in Waimanalo (both broadcast and drilled in rows) showed excellent crop uniformity and stand establishment, vigorous growth, and local adaptability. The only cultivar currently available in the USA is 'SoilSaver', which is a joint release between Auburn University and IAPAR (Institute of Agronomy of Parana, Brazil).

For assistance:

Contact your nearest Cooperative Extension Service office for additional assistance in selecting appropriate cover crops and green manures for your farm and cropping situation. Help can also be obtained from the USDA Natural Resources Conservation Service field offices located on each island.

Visit CTAHR's Sustainable Agriculture for Hawaii Program Website at <<http://www.ctahr.hawaii.edu/sustainag>> to find additional information about green manure and cover crops. The site also includes references and links to other useful on-line resources.



Sustainable Agriculture in Hawaii . . .

. . . integrates three main goals—environmental health, economic profitability, and social and economic equity. Sustainable farms differ from conventional ones in that they rely more on management practices such as crop diversification and crop rotation, agroforestry, integrated pest management, rotational grazing, and innovative marketing strategies. For further information on Sustainable Agriculture in Hawaii, contact:

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This material is based on work supported by the Cooperative State Research, Education, and Extension Service, U.S. Department of Agriculture, and the Agricultural Experiment Station, Utah State University, under Cooperative Agreement 98-ESAG-1-0340. Portions of this text were adapted from the USDA Natural Resources Conservation Service Hawaii Field Office Technical Guide, Section IV, Code 340, "Cover and Green Manure Crop" May 1992. Plant drawing reprinted from *Managing Cover Crops Profitably*, 2nd edition, published by USDA's Sustainable Agriculture Network (SAN), original illustration by Marianne Sarrantonio and Elayne Sears. Logo drawing courtesy of Deitrich Varez.

