Cover Crop Information Sheet

DAIKON RADISH (*Raphanus sativus*)

Also known as cultivated radish, radish, oilseed radish, forage radish. Radishes are commonly used in cover crop mixtures and sometimes as monocultures. If planted early, quick growth can be useful as a fall forage. In fields with high residual nitrogen and with little competition, roots can get very large. They may not reliably winterkill in the Piedmont, but should winterkill in Mountains and Ridge & Valley.

Recommended Varieties

Variety	Reasons Why	Source
'Common' VNS	Available. Produces large fleshy root.	
Defender oilseed radish	More branched root and more top growth.	Jimmy Carter Plant Materials Center data
Sod Buster	Produces large fleshy root. Claims high level of glucosinate which can suppress nematode populations.	Petcher Seeds
Eco-till Soil Buster	Produces large fleshy root.	
Smart Radish, Nitro Radish, Graza Radish, Nematode Radish	Nitro is a standard oil seed radish, Smart has more branch roots and more top growth, Graza has less root and more forage, Nematode claims high level of glucosinolates.	Green Cover Seed

Planting Information

Information		Comments	Source
Drilled Seed Depth (inches)	¼ - ¾	Should not be planted later than Halloween. Can plant in August.	Managing Cover Crops Profitably
Drilled Seeding Rate (lbs/acre)	8 - 13	Higher seeding rate may increase competition and decrease root size.	Managing Cover Crops Profitably, Jimmy Carter Plant Materials Center data
Broadcast Seeding Rate (lbs/acre)	8 – 20	Not recommended for overseeding in dormant pastures	Managing Cover Crops Profitably

Termination Information

Information	Source
Radishes can be terminated by heavy grazing. Brassicas can also be terminated by herbicides, mowing after flowering, and tillage. They need to be killed before full bloom to prevent seed set. Full rate of paraquat (0.75 lb ai/acre), multiple applications of glyphosate, or glyphosate plus 1 pt/acre 2,4-D may be needed to terminate. Consult your local Extension and state Pest Management Handbook for herbicide recommendations. Always follow the herbicide label.	GA and VA county agent – personal communications, Managing Cover Crops Profitably

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DAIKON RADISH (*Raphanus sativus*)

Cultural Traits

Traits		Comments	Source
Typical Dry Matter Range (lbs/acre)	4,000 - 7,000		Managing Cover Crops Profitably
Typical Total N Range (lbs/acre)	50 - 100	N is released very quickly, usually within a month and can be lost to leaching if other plants are not actively growing.	Managing Cover Crops Profitably, Radishes – A New Cover Crop for Organic Farming Systems
Life Cycle	Cool season annual broadleaf		Managing Cover Crops Profitably
Growth Habit	Upright		Managing Cover Crops Profitably
Preferred Soil pH	6.0 - 7.5		Managing Cover Crops Profitably
Relative Seed Cost ($/acre)	$$		Based on survey of seed costs using maximum price and max seeding rate
Min. Germination Temp (F)	45°		Managing Cover Crops Profitably
Cautions	Neighbors may complain about the odor during decomposition. Livestock must be trained to graze brassicas.		

Forage Traits

Information	Source
Brassicas provide good quality forage during winter and early spring but should never make up more than 75 percent of cattle diet because of their low fiber content.	UGA Forages

Sources:

Gruver, J., R.R. Weil, C. White, Y. Lawley. 2017. Radishes – A New Cover Crop for Organic Farming Systems. eXtension. Organic Agriculture.

Jimmy Carter Plant Materials Center Annual Reports: https://www.nrcs.usda.gov/wps/portal/nrcs/detail/ga/plantsanimals/?cid=nrcs144p2_022076

Managing Cover Crops Profitably: https://www.sare.org/Learning-Center/Books

USDA Oilseed Radish Plant Guide: https://plants.usda.gov/factsheet/pdf/fs_rasa2.pdf

Cover Crop Information Sheet

OATS (*Avena sativa*)

Oats can produce a good amount of biomass and are not as tall as cereal rye. Many small-scale producers use oats before early planted spring vegetables. Oats tend to have a lower carbon:nitrogen ratio than cereal rye, but are more susceptible to Barely Yellow Dwarf Virus and rust. Oats suppress root-knot nematodes. Some oat varieties may sometimes be mistakenly identified as Black oats (*Avena strigosa*). Black oats are not cold tolerant and not appropriate for the Piedmont, Mountains, and Ridge & Valley regions.

Recommended Varieties

Variety	Reasons Why	Source
Coker 277	Standard variety, cold tolerant.	
Horizon 720, Legend 567	Good forage varieties, resistant to crown rust, good biomass.	Jimmy Carter Plant Materials Center data
Cosaque	Good cold tolerance, more susceptible to rust than rye or black oats. Cosaque is sometimes mistakenly sold as a black oat but is *Avena sativa.*	
Graham	A shorter height variety.	Clemson University

Planting Information

Information		Comments	Source
Drilled Seed Depth (inches)	½ - 1 ½		Managing Cover Crops Profitably
Drilled Seeding Rate (lbs/acre)	60 - 70		Managing Cover Crops Profitably
Broadcast Seeding Rate (lbs/acre)	70 - 100		Managing Cover Crops Profitably

Termination Information

Information	Source
Most vegetable farmers use mowing and incorporation for termination. Flail mowers provide the finest residue and most even distribution, but rotary mowers can be used. Small scale farmers can use weed-eaters on smaller beds. Residue should be incorporated as soon after mowing as possible. Leave at least 2 weeks for residue to decompose before planting. If there is high biomass, then 3 weeks or more may be needed. Decomposition is greater in moist, warm conditions. If the soil is dry then irrigation may be necessary. Cool soils conditions will lengthen time needed before planting. With no-till production, apply herbicide and then roll and crimp 2 days later. For organic systems, roll/crimp, and then repeat in same direction 2-3 days later. Herbicides are usually more effective after blooming (antheses). Rolling & crimping is most effective at milk to soft dough stage. Consult your local Extension and state Pest Management Handbook for herbicide recommendations. Always follow the herbicide label.	Managing Cover Crops Profitably

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Cultural Traits

Traits	Comments	Source
Typical Dry Matter Range (lbs/acre)	2,000 - 7,000	Managing Cover Crops Profitably
Typical Total N Range (lbs/acre)	Not available	
Life Cycle	Cool season annual cereal	Managing Cover Crops Profitably
Growth Habit	Upright	Managing Cover Crops Profitably
Preferred Soil pH	5.5 - 7.5	Managing Cover Crops Profitably
Relative Seed Cost ($/acre)	$$$	Based on survey of seed costs using maximum price and max seeding rate
Min. Germination Temp (F)	38°	Managing Cover Crops Profitably
Cautions		

Sources:

East Texas Seed: https://www.easttexasseedcompany.com/oatswheat.php

Jimmy Carter Plant Materials Center Annual Reports: http://caes2.caes.uga.edu/commodities/fieldcrops/forages/species/Oat.html

Managing Cover Crops Profitably: https://www.sare.org/Learning-Center/Books

WINTER PEAS (*Pisum sativum* L.)

Winter peas are often used in cover crop mixes. Pea may be faster growing in the fall than clover or vetch; consequently, may provide better winter ground coverage. The winter pea varieties available currently are susceptible to *Sclerotinia* (white mold), a disease intensified under cool, wet conditions often encountered in the Southeast. Use caution planting pea as a cover crop directly before beans, because pea could potentially intensify disease or insect problems in the following legume cash crop. Winter peas are often mixed with small grains in order to enhance biomass production and mixing the two may reduce disease as the grains help keep the vines off the soil where they are more susceptible to disease. Peas are large seeded and can sometimes settle differently in a drill or broadcast seeder than the accompanying small grain seed, resulting in uneven distribution of cover crops in a field if the grower is not careful when seeding. It is a nematode host and should not be planted in fields with nematode problems. Winter peas are sensitive to soil salinity and extreme acidity. In the Southeast, peas may exhibit cold injury after freeze events in the form of foliar necrosis. This injury is often transient, and many varieties are capable of recovering from cold injury in this region, but winter peas may winterkill in the Mountains.

Recommended Varieties

Variety	Reasons Why	Source
CAH-11, Chelan, Common, Fenn, Granger, Melrose, Romack, Specter	Produced 3,000-6,750 lbs dry biomass /acre in NC variety trials.	R.A. Vann et al. - Unpublished
Frostmaster, Survivor, Whistler, and Windham	Cultivars with smaller leaf sizes and are typically more winter hardy.	MS Plant Materials Center data

Planting Information

Information		Comments	Source
Drilled Seed Depth (inches)	1 - 3	Breeders indicate better anchoring, cold tolerance, and growth if planted 2 – 3 inches.	Managing Cover Crops Profitably
Drilled Seeding Rate (lbs/acre)	40 – 60 in monoculture, 30 – 40 in mixture	Use the inoculant *Rhizobium leguminosarum biovar viceae*. Pea generally performs best when drilled on narrow row spacing (<10 inch).	GA Cover Crop Standard, NCSU variety trials
Broadcast Seeding Rate (lbs/acre)	45 – 70 Not usually recommended	Pea seed can be broadcast if good moisture is present following broadcasting; biomass production will likely be less than that for drilled pea.	Wright et al. 2013, R.A. Vann and S.C. Reberg-Horton

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WINTER PEAS (*Pisum sativum* L.)

Termination Information

Information	Source
Most vegetable farmers use mowing and incorporation for termination. Flail mowers provide the finest residue and most even distribution, but rotary mowers can be used. Small scale farmers can use weed-eaters on smaller beds. Residue should be incorporated as soon after mowing as possible. Leave at least 2 weeks for residue to decompose before planting. Legumes decompose quickly and most of the nitrogen is released within 1 month after incorporation. Decomposition is greater in moist, warm conditions. If the soil is dry then irrigation may be necessary. Cool soils conditions will lengthen time needed before planting. If using herbicides for termination, consult your local Extension and state Pest Management Handbook for herbicide recommendations. Always follow the herbicide label.	Managing Cover Crop Profitably,

Cultural Traits

Traits		Comments	Source
Typical Dry Matter Range (lbs/acre)	3,000 - 4,500	Pea variety and growth habit have a large influence on biomass production.	Managing Cover Crops Profitably, Unpublished Literature Review in Piedmont – Gaskin, Atwell 2017
Typical Total N Range (lbs/acre)	70 - 120		Unpublished Literature Review in Piedmont, Atwell 2017
Life Cycle	Cool season annual legume		
Growth Habit	Viney, Prostrate to Climbing		
Preferred Soil pH	6.0 - 7.0		Managing Cover Crops Profitably
Relative Seed Cost ($/acre)	$$$$		Based on survey of seed costs using maximum price and max seeding rate
Min. Germination Temp (F)	41°		Managing Cover Crops Profitably
Cautions	Susceptible to *Sclerotinia. I*s not a good choice for fields with a history of problems with *Sclerotinia* or for use before a susceptible spring crop such as lettuce or crucifers. New varieties are being developed with resistance.		USDA Pea Plant Guide; Clemson University

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Sources:

Atwell, R.A. (2017). Optimizing short-term cover crop benefits through genotype screening and management. Ph.D. diss., North Carolina State University, Raleigh, NC.

MS Plant Materials Center data:
https://www.nrcs.usda.gov/wps/portal/nrcs/main/plantmaterials/pmc/southeast/mspmc/

NRCS GA Cover Crop Standard:
https://efotg.sc.egov.usda.gov/references/public/GA/Cover_Crop_(340)_Standard_October_2015.pdf

USDA Pea Plant Guide: https://plants.sc.egov.usda.gov/plantguide/pdf/pg_pisa6.pdf

Wright, D.L., E.B. Whitty, and A.R. Blount. 2013. Planting dates, rates and methods of agronomic crops. UFL #SS-AGR-150.