



COVER CROP PROGRAM

King's Agriseeds - ***Designing Cover Crop programs for your farming system.***

Proven Mixtures, Diverse Species, Experienced Support

Summer Cover Crops

Dave Wilson – Agronomist

Mid-Spring and throughout Summer

Buckwheat (*Fagopyrum esculentum*)

Planting Windows: Plant after all dangers of frost are gone, this is mid May in central PA and south and the end of May in northern PA and to the North.

Seeding rate: Drill: 50 to 60 lbs/A, seeding depth $\frac{1}{2}$ to $1\frac{1}{2}$ inch deep. (In dryer soil conditions drill at the deeper depths)

- For quicker canopy development seed up to 80 lbs/acre.
- Broadcast: up to 100 lbs/acre for a fast growing smother crop.

Don't plant buckwheat after using these **herbicides** on the season's first crop: Atrazine, Pursuit (imazethapyr), Sandea and Permit (halosulfuron) and Reflex (fomesafen)

There are no carryover problem with these materials: Basagran (bentazon), Command (clomazone), Dual Magnum (S-metolochlor), Eptam (EPTC), Prowl (pendimethalin), Raptor (imazamox), Roundup (glyphosate), Sencor (metribuzin), Treflan (trifluralin)

Buckwheat can be sown after vegetables or other crops any time from early June through mid August.

BENEFITS

- Reduces weed pressure and improves soil conditions.
- Buckwheat is a quick cover; it establishes blooms and reaches maturity in just 70 to 90 days.
- Used to suppress summer annual weeds for over 400 years in the Northeast.
- Buckwheat extracts Phosphorous from the soil and makes it more available to the following crop.
- Use as a nurse (companion) crop for late summer-sown forages such as (alfalfa or alfalfa-grass mixtures), summer seeding made in late July through mid August. Rapid buckwheat establishment will suppress summer annual weeds; mowing buckwheat provides mulch against winter annual and biennial weeds.
- After early vegetables have been harvested. Buckwheat fits in rotation to suppress weeds and improve soil conditions. (Open field long enough 6-7 weeks between vegetable harvest and fall crop.)

- Use to bring idle land back into production, double crop buckwheat.
- Prepare for strawberries- full growing season in beds before Strawberries.
- Perennial weeds, especially quack grass, are weakened by mid-summer tillage and recover poorly in a stand of buckwheat.
- The buckwheat's shallow white blossoms attract beneficial insects that attack or parasitize aphids, mites, and other pests.
- The beneficial insects attracted by Buckwheat include hover flies (Syrphidae), predatory wasps, minute pirate bugs, insidious flower bugs, tachinid flies and lady beetles.
- Buckwheat flowering may start within three weeks of planting and continue for up to 10 weeks.
- Buckwheat will do well on poor soils and improve soil quality.
- Buckwheat's abundant fine roots leave the soil loose and friable.
- Can be easily no-tilled into.
- With winter annual crops, buckwheat frost kills.

Summer Buckwheat –Photos –Dave Wilson



Flowering Summer buckwheat (Note:Dense canopy smothers summer weeds)



Hollow Stems of Buckwheat plants break down quickly.



The Quick growing green leafy material of Buckwheat plant gives good canopy and quick smothering of weeds. This material also breaks down quickly. Can be killed easy and/or disked in easy for a quick rotation to the next crop.



Other Summer Cover Crops

Sorghum – Sudangrass hybrid (*Sorghum bicolor* x *S. bicolor* var. *Sudanese*) (Quickcover)

Quickcover is a non BMR hybrid, to be used as quick growing summer cover crop.

Planting Windows: Plant as a summer cover crop after soil temperatures have reached 60°F and rising. Plant Late spring (mid-May) or early summer once soil has warmed up. Rule of thumb is to plant no earlier than 2 weeks after corn planting.

Widely adapted – Sorghum-Sudangrass hybrids can be grown throughout the U.S. wherever rainfall is adequate and soil temperatures reach 65°F to 70°F at least two months before frost.

Seeding rate: 50 to 60 lbs/A, seeding depth $\frac{3}{4}$ to 1½ inch deep. Drill using large seed box. ***Firming the seed after seeding is desirable if it is dry or if rainfall is not anticipated before seedling emergence. This will help to conserve moisture and optimize seed to soil contact.***

Sown at higher rates 70 to 90 lbs per acre this makes an excellent smother crop.

BENEFITS

- Excellent summer cover crop, catch crop and weed suppressant.
- Sorghum-Sudan has a high demand for nitrogen, which makes it a good catch crop, scavenging excess nitrogen in the soil, preventing it from leaching out.

- QuickCover Sorghum-Sudangrass is clean seed; free of Shattercane and Johnsongrass weed seeds.
- As a smother crop, Sorghum-Sudangrass will suppress such annual weeds as velvetleaf, large crabgrass, barnyardgrass, green foxtail, smooth pigweed, common ragweed, redroot pigweed and purslane.
- Non-BMR type good for short season addition of organic matter in warm weather.
- Sorghum Sudangrass hybrid will produce the most biomass compared to other summer annuals.
- Once established, will tolerate some drought.
- Due to its rapid and dense growth habit, sorghum-Sudangrass can out-compete weeds, providing a mulch, and erosion control and improving soil tilth.
- Very useful as a mid-summer cover and weed control before fall planting.
- Vegetable fields with weed problems can be rotated in a series of short-season covers that include small grains in the fall and sorghum-Sudangrass during the summer. (each cover is incorporated into the soil before the next cover is planted)
- Subsoil aerator – Mowing whenever the stalks reach 3 to 4 ft tall increases the root mass five to eight times compared with un-mowed stalks, and forces the roots to penetrate deeper into the soil.
- After mowing, tops grow back green and vegetative until frost and tillering creates up to six new, thicker stalks per plant.
- Nematode and disease fighter-Sorghum Sudangrass is not a host crop for many nematodes and other pests, by planting this crop in rotation it break disease and insect pest cycles.

Tall Growing QuickCover Sorghum Sudan (Left Side of Picture) grows much biomass and smothers weeds. As a cover crop Quickcover can be cut at this stage and then worked into the soil, or cut and let to re-grow more biomass and then worked into the soil; or left to grow and winter-kill. The options depend on the cropping system rotation.



Below-Quick Cover Sorghum-Sudangrass in late October (Berks County- PA)



Jerry Oats on left side of picture and QuickCover Sorghum-Sudangrass on right side, in late October (Berks County –PA). Notice the amount of biomass from Quickcover going into winter, which will winter kill.



Below are the same strips as above, this is the following year in early April, the winter killed Jerry oats on left, Winter Killed Quickcover Sorghum-Sudangrass on Right. (Dead Mulch-mat soil cover)



Close up of Winter Killed Quickcover Sorghum-Sudangrass.



Winter Killed Quickcover Sorghum-Sudangrass, provided a dead cover crop mulch to keep soil covered over the winter and prevented erosion. In the spring this can be worked into soil for decomposition. Another option: With the proper no-till equipment it can also be no-tilled into and left on the soil surface as a dead mulch soil cover.



Teff (*Eragrostis tef*)

Teff is a summer annual forage grass, utilizable as a summer cover crop.

Planting Windows: Plant as a summer cover crop after soil temperatures have reached 60°F and rising. Plant Late spring (mid-May) or early summer once soil has warmed up.

Widely adapted – Teff can be grown throughout the U.S. wherever rainfall is adequate and soil temperatures reach 65°F to 70°F at least two months before frost.

Seeding rate: 6 to 8 lbs/A, seeding depth- shallow 0 to ¼ inch deep. Drill using the small seed box. Drilling into a firm seed bed is desirable, when seeding teff, prepare the seedbed in much the same manner as for alfalfa — the firmer the better. Broadcast planting using a Brillion grass seeder and cultipacker combination or a spinner type grass seeder is optimal. Some seed should be seen on the surface after planting with a drill. **The most critical mistake when planting teff is planting it too deep.** Also very important is **firming the seed after seeding.** This is desirable, especially if it is dry or if rainfall is not anticipated before seedling emergence. This will help to conserve moisture and optimize seed to soil contact.

BENEFITS

- Excellent summer cover crop, catch crop.
- With adequate moisture, Teff seed germinates rapidly after planting. It reaches the heading stage in about 8 weeks.
- In vegetable rotations after early vegetables comes off it can be seeded, May through July.
- It can double as forage and be harvested for hay or grazed.
- **Teff can be established as a summer cover between vegetable beds and let grow to recycle nutrients and prevent erosion.**
- Teff can be grown, in most locations, without insecticides or fungicides. It is for the most part, considered a low input crop.
- Teff hay is high in calcium as well as phosphorus, iron, copper, aluminum, barium, and thiamine. Potassium levels have been reported in some hays in the 2.5-3.0% range. This makes it valuable not only as forage hay but also the cut material can be used as a nutritive mulch in vegetable systems or turned under as an excellent summer grown green manure recycling nutrients and breaking disease cycles in vegetable production systems between spring planted greens and fall planted vegetables.
- Excellent crop for erosion control, Strips can be grown in between other row crops or vegetable crops on the slope to prevent erosion during the summer.

Summer Teff Grass



Summer grown Teff Grass, Good Nitrogen Scavenger during the summer and makes a quality, fine forage or hay.



Summer Teff (stem view)



Leafy Summer Teff



Braco white mustard (*Brassica alba* or *B. hirta*.)

North Carolina to Maine.

Planting Window: Early spring, summer or early fall, (it may flower in fall if planted in June or July, if it is not killed or tilled in) If it is desired to be left as a winter-killed mulch its better to plant in early to mid September. Plant as a summer cover crop or break crop in-between small grains or vegetables.

Seeding rate: 8 to 10 lbs/A, can be drilled or broadcast to one-half inch depth. 15 to 20 lbs/A as a summer smother crop or to grow much biomass to till in as a bio-fumigant.

In late summer/early-fall White mustard can be seeded with Triticale, Rye or hairy vetch cover crop.

White mustard is a cover crop that can be used in vineyards, annual crop rotations or in vegetable rotations. As a natural nematode suppressant, Braco white mustard both interferes with completion of the feeding nematode larvae life cycle and acts as a natural occurring bio-fumigant when turned under into the soil just before or at flowering.

BENEFITS

- Suppresses nematodes, other soil-borne organisms and weed seed germination
- Rapid growth suppresses growing weeds.
- Used as a break crop to suppress diseases and pathogenic nematodes for growers of root crops like potatoes and sugar beets and for small grain rotations.
- Increases soil tilth, mustard tap roots can grow to the depth of 1 to 3 ft.
- Increases soil organic matter.

- Produces a large amount of high protein green material, if plowed down it will recycle nitrogen and reduce the N needs for the following crop.
- Flowers attract honeybees, and hover flies (Syrphidae), most larvae of the hover flies are predators of many soft bodied insects such as aphids, scale insects, thrips and caterpillars.
- White mustard will typically winter kill, making a desirable mulch to accommodate early spring-sown vegetables.
- Quick spring cover crop – Field Crops -can be frost seeded in March or early April in corn stubble before planting Soybeans, incorporate or kill after flowering.
- Quick spring cover crop – Vegetable Crops - Frost seed in March or early April, incorporate or kill after flowering before May planted vegetables: tomatoes, peppers, potatoes, sweet corn (Don't use before other brassicas like Cauliflower in rotation).
- Used for disease control after onions, lettuce or garlic.
- Suppresses verticillium in potato and reduces weeds in the following crop.
- In small grain after small grain rotation: Plant after barley or wheat harvest, let grow until early October, mow and turn in green material as a bio-fumigant break crop.
- Winter killed cover crop which produces winter killed mulch for early spring planting.

Bio-fumigation technique, utilizing white mustard

- 1) Allow 60 to 70 days of growth before cutting.
- 2) Flail mow or chop to reduce the particle size.
- 3) Incorporate the plant material into the soil with a disk 5 to 6 inches deep with disk.

Braco White Mustard blooming in late October before winter. Just before this stage (pre-bloom to early bloom) is when we would mow and turn it into the soil for the Bio-Fumigation effects.



Braco White Mustard



Below: Braco White Mustard blooming in Late October provides honey bees late nectar and pollen foraging.



Below: Braco White Mustard in early April after winter kill. On Left side is winter killed Daikon radish, on the right side is winter killed Braco white mustard. Both the Daikon radish and the Braco white mustard had very good weed suppression effects on winter annual weeds.



Tall stemmy Braco white mustard after winter kill, still gave winter and early spring non-living soil cover with plant dead roots and tall dead stems.



Worm foraging on dead Braco white mustard root in soil, in early April.



Hollow stemmed Braco-White mustard stems can be turned into the soil, or can be rolled down and no-till planted into.



Braco white mustard dead stem.



The residual effect of the Braco white mustard plants kept the soil virtually weed free from winter annual weeds into April. Look at soil surface under the dead stems, **no weeds were to be found**. Braco white mustard did a better job at suppressing weeds compared to the winter killed oats and the winter killed Quickcover Sorghum-Sudangrass.



Notice below - No Winter Annual Weeds under Braco white Mustard, the entire stand was this clean.

