

Seed Production of Goldenmane Tickseed¹

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Species Description

The genus *Coreopsis* is Florida's State Wildflower. *Coreopsis basalis*, commonly known as Goldenmane Tickseed or Dye Flower, brightens roadsides and fields of central and north Florida from as early as April to as late as mid-June (Figure 1). During dry years, however, flowering is mainly in May. This drought-tolerant, annual usually is found from North Carolina to Texas, although it has been observed as far north as Connecticut and Illinois.



Figure 1. Goldenmane Tickseed being grown for seed in north Florida.

In Florida, Goldenmane Tickseed prefers sunny, disturbed sites that have dry, sandy soil and is often

found coexisting with bahiagrass. In dry, sandy soils bahiagrass sod or stands are open enough to allow Goldenmane Tickseed to grow competitively with the grass. Since it is a spring annual, most of its growth and flowering take place before bahiagrass grows large enough to out-compete it.

Goldenmane Tickseed is an upright plant with elongated leaves that are dissected or divided (Figure 2). It is usually 1 to 1 1/2 feet tall but can grow much taller. Height is strongly dependent on soil moisture and nutrient levels as well as light level. In shaded areas it can be very "leggy" and grow as tall as 5 ft. The 3/4- to 1 1/2-inch-diameter flowers have dark purple disk flowers and showy yellow ray flowers ("petals"). A dark red to maroonish spot is at the base of each ray flower (Figure 3). The size of this spot is variable and at times the dark red spot is barely noticeable.

Establishment and Maintenance

Naturally Occurring Populations

Naturally occurring fields are especially prevalent in Madison County and south through Alachua County. They occasionally occur in Leon and Gadsden County. If managed properly, these

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populations will thrive, thereby reducing or eliminating costs associated with site preparation and planting.



Figure 2. Young plant of Goldenmane Tickseed.

Site Preparation

Goldenmane Tickseed should be grown on well-drained soil. Using the tilling and soil solarization methods described in this section, prepare the seed bed in such a manner so that:

- There will be good seed-to-soil contact.
- Sown seed will be in the top layer of soil no more than about 1/8 inch deep.
- Weed competition is minimized.

Once the soil is prepared, consider installing an irrigation system (See "Irrigation").

Minimum Till. About 4 weeks before sowing seed, kill existing vegetation with a nonselective, translocated herbicide that contains either glyphosate or glufosinate as the only active ingredient. More than one application will probably be needed to kill the weeds; the second application should be about 2 weeks after the first application. About 2 weeks after the second application, mow the dead vegetation close to the soil and bag the clippings, or if permitted, burn off the dead vegetation. Then, lightly scarify the field with a disk or harrow so that the soil surface is barely scratched. Disking or harrowing at least one



Figure 3. The characteristic small, dark red spots at the base of the petals of Goldenmane Tickseed.

time in a perpendicular direction will increase the amount of soil surface that is scarified. Lightly scarifying the soil facilitates good seed-to-soil contact while minimizing soil disturbance that creates weed problems.

Disking or harrowing will not be necessary if a no-till drill will be used to sow the seed, and will probably not be necessary if the soil is sandy. However, if the seed bed soil is loose, it will have to be made firmer so that the seeds do not sink too far into the soil. A turf roller or cultipacker can be used to firm up the seed bed.

Deep Till. While the method above avoids weed competition by minimizing soil disturbance, the goal of the deep till method is to substantially deplete the weed seed bank in the soil. This method will result in a well tilled soil and minimal weed competition, but it can take up to 2 years to complete.

Existing vegetation is killed with a nonselective, translocated herbicide containing either glyphosate or glufosinate as the only active ingredient. The field is then deep tilled and a new crop of weeds is allowed to emerge. When weed seedlings are 1 to 3 inches tall, kill them as before. Repeat this herbicide/tilling cycle for up to 2 years. Since the soil is deep tilled, the seed bed will have to be made firmer before seed is sown. It is very important that emerging weeds not be allowed to flower, and that the area surrounding the field is mowed often enough to prevent weeds from flowering.

Soil Solarization. This is a cultural method of pest control in which clear polyethylene is laid over

moist, tilled soil for 6 to 12 weeks to trap incoming solar radiation, thereby heating the soil to temperatures lethal to many weed species and soilborne pests. Several points to keep in mind are:

- Use this method only in summer or early fall.
- This method will only control/suppress soil pests 6-8 inches down in soil.
- Soil must be kept moist.
- Some crabgrass species may not be controlled.

Additional information about this technique can be found in Florida Cooperative Extension Service Publication ENY625 (2).

Planting

Plant Goldenmane Tickseed in late summer or early fall on a firm seed bed. If the soil is loose, seed could get buried too deep and inhibit seedling emergence. Sow at least 2 pounds of Pure Live Seed³ (PLS) per acre, or at least 4 pounds of bulk seed if PLS is not known. This rate should yield a stand canopy that is dense enough to reduce weed competition.

Production fields can be established as solid stands or in rows. To uniformly distribute seed by hand over an entire small plot (less than 1 acre), mix half the seed with slightly moistened sand or a similar inert material. The ratio of sand to seed (by volume) should be 9:1 or greater. Spread this half of the seed over the entire plot; repeat this process with the other half of the seed. When planting in rows mechanically or by hand, dilute the seed with sand as described above. Space rows far enough apart so that you can use a cultivator to control weeds.

A no-till seed drill, if available, can be used to plant large, solid stands. To obtain spaced rows, cover the drop tube holes in the seed drill hopper that are necessary to obtain the desired row spacing.

If seed was not planted with a no-till seed drill, cultipack or roll the seed bed, or simply scratch the seed into the soil with a rake. Good seed-to-soil contact is critical for optimal germination. However, make sure that seed is not buried more than about 1/8 inch deep or emergence could be inhibited.

Seed planted in the summer will germinate by October. Irrigate to facilitate good stand establishment for seeds sown in the fall by applying at least 1/4 inch water per day for the first 2 to 3 weeks after planting. Use supplemental irrigation to compensate for the lack of rain. Seedlings will form rosettes and remain at this stage until the weather warms up in the spring.

Fertilization

There is some evidence that supplemental fertilization can improve yield and quality of Tickseed species (Norcini, unpublished results; Terry Zinn, personal communication). First have a soil test conducted to determine soil levels of nitrogen (N), phosphorus (P), and potassium (K). If warranted, apply a fertilizer with a low N, low to no P, and high K ratio (for example, 5-0-20 or 5-5-20) at 200-300 lb N per acre in late February or early March. Keep in mind that excess nitrogen will promote vegetative growth over flower and seed production.

Irrigation

Even though Goldenmane Tickseed is drought tolerant, consider supplemental irrigation. Flowering season of natural stands is extended when rain occurs regularly during the spring. Use supplemental irrigation to ensure that plants receive at least 1 inch water per week. When irrigating the crop apply at least 3/4 inch each time to encourage a deeper root system.

Weed Control

Weeds are a major pest problem. They could reduce seed yield by competing with the crop for water and nutrients. However, even if weed competition seems minimal and the crop is thriving, use cultural practices that will reduce the amount of weed seed that could be harvested with the crop seed. It will probably be easier to prevent weed seed from getting into your harvest than to clean it out later. In addition, marketing of the seed will be difficult or impossible if there are too many weed seeds mixed in with the crop seed. Eliminate weeds that grow into the canopy of the crop to prevent weed seed from being harvested along with the crop seed. Be especially diligent about eradicating noxious weed

species (1) from your planting. There can be no noxious weed seed in any seed sold in Florida.

If chemical weed control is to be part of the weed management program, use a preemergence herbicide. It's usually less expensive to prevent weed growth than to kill existing weeds. Pennant[®] and Treflan[™] are the only preemergence herbicides currently labelled for use on all *Coreopsis* species. While these herbicides should be safe to use on Goldenmane Tickseed, herbicide tolerance can vary depending on seed source and growing conditions. It would be prudent to test these herbicides on a small portion of the planting prior to widespread application. Check for injury for 1 to 2 months after application.

Existing annual and perennial weeds can be controlled by hand-weeding or with directed applications of a nonselective herbicide that contains glyphosate or glufosinate as the only active ingredient. Small or immature weeds can be killed with a directed application of a contact herbicide that contains diquat or an herbicidal soap as the only active ingredient. Whenever applying nonselective or contact herbicides, use a shielded spray nozzle to reduce the likelihood of spray drift damaging the crop.

For row crops, control weeds in aisles with a cultivator or with directed applications of a nonselective or contact herbicide as mentioned above. If cultivating, do it before weeds start flowering.

Grasses that are growing in or around crop plants can usually be controlled with postemergence application(s) of Acclaim[®] Extra. Like the preemergence herbicides mentioned above, this herbicide is labelled for all *Coreopsis* species but should be tested on a small portion of the crop prior to widespread application.

Whenever using any herbicide, read and follow all label directions, including those for protective safety equipment and re-entry intervals.

Other Pests

No significant insect or disease pests have been observed on Goldenmane Tickseed crops in Florida.

Composite Thrips (*Microcephalothrips abdominalis*) and Western Flower Thrips (*Frankliniella occidentalis*) have been detected (3) but it is not known whether seed production is affected. The only effect of these thrips seems to be cosmetic damage on the flower petals (Figure 4).



Figure 4. Thrips injury on a Goldenmane Tickseed flower.

Stand Longevity

Goldenmane Tickseed is a good seed producer. Since all seed cannot possibly be harvested, replanting should not be necessary.

Harvesting Seed

Seed is ripe when the seed head turns dark brown and has a “dried” appearance (See ENH 868, "Seed Production of Leavenworth's *Coreopsis*", <http://edis.ifas.ufl.edu/EP122> for a picture of a mature seed head). Seed (Figure 5) can be harvested at this stage because the seed head opens soon after it turns brown.

When the seed head opens, seed will fall to the ground with the slightest disturbance. Typical yields of clean seed range from 20 to 50 lb per acre.

General Harvesting Methods

Manual. Harvesting with pruning shears is a very selective method as only ripe seed heads are harvested. Because plants will continuously flower throughout the spring, seed yields are maximized. Use this method in small plots designed for seed increasing as it is very labor intensive.

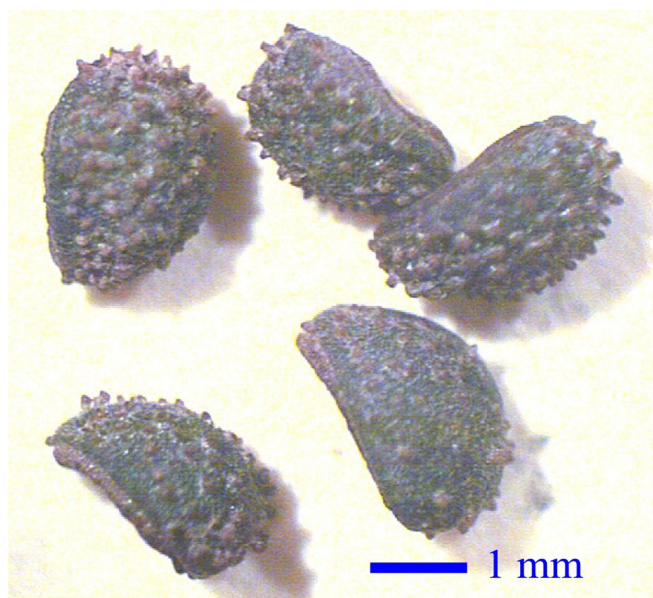


Figure 5. Seed of Goldenmane Tickseed.

Handheld Seed Stripper. This piece of equipment is a modified landscape string trimmer (5). A beater bar strips mature and immature seed heads off wildflowers (4), with seed heads being deposited in a removable bag that partially surrounds the beater bar. The seed stripper is less selective but more efficient than using pruning shears (4). Use this method to harvest small areas of the crop that have ripe seed.

Modified Leaf Vacuum. A leaf vacuum attached to a small garden tractor can be modified so that the vacuum intake passes over the top of the crop. This method is more selective than the seed stripper. The harvest will be mainly ripe seed along with a low percentage of immature seed and flower parts. Vacuum harvesting should be done regularly during the flowering season as seed ripens continuously over several weeks. This is a good method for harvesting row crops.

Combine. A combine is most effectively used for crops of 1 acre or more. Since all mature and immature seed will be harvested, monitor seed ripeness of the crop to maximize harvesting of mature seed.

Postharvest Drying

Harvested seed, especially seed harvested by a combine or seed stripper, will contain some leaves, stems, and immature seed. Dry seed relatively

quickly, before it is cleaned. If the plant material remains moist too long, the seed mixture will start to heat up and could kill some seed or reduce seed quality.

Spread harvested seed on a clean, smooth, hard surface in a shed or barn and allow it to dry for a few days before cleaning. A floor fan will facilitate drying if the harvest is large. If the floor is not clean, spread a thin layer of seed on brown packing paper or newspaper. (Visit your local newspaper and ask for the ends of newsprint rolls.) If drying seeds outdoors, wind may blow seed away, and dew and rain may slow the drying process.

An alternative method is to dry the seed in a drying bin (Figure 6). A simple seed drying bin consists of four plywood walls, a porous false bottom, and a source of warm, dry air (less than 100°F). Openings in the false bottom need to be small enough that seed do not fall through. It is important that the seed be spread out thinly and evenly over the entire floor of the bin. If part of the floor is not covered with seed, the air will preferentially flow through that gap and increase the time it takes to dry the seed.

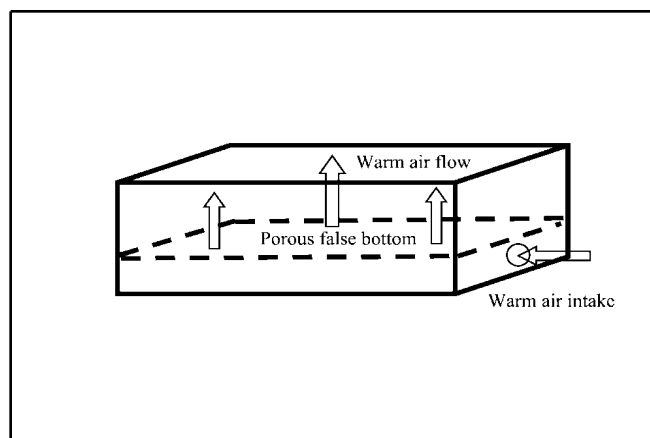


Figure 6. Diagram of a simple seed drying bin.

Cleaning Seed

A two-screen (or more) air-screen cleaner can be used to clean seed. If further cleaning is necessary, try replacing screens in the air-screen cleaner with screens of different pore sizes or shapes. Additional cleaning of the seed can be done with an air density seed separator or gravity table. Clean seed so that purity is greater than 90% pure (by weight) and

contains less than 1% weed seed (by weight) but no noxious weed seed.

Small quantities of seed can be cleaned by hand with screens used in an air-screen cleaner. Screens can be purchased for about \$35 each.

Seed Storage

After the seed has been cleaned, store it in a cool, dry environment, such as a large refrigerator or walk-in cooler, for maximum shelf life. The current rule of thumb is that temperature (°F) + relative humidity (% RH) in the storage facility should total 100 or less. For example, storing seed at 35°F and 40% RH (35+40=75) would be adequate.

If seed is going to be stored in a shed or barn, it needs to be protected against insects and rodents.

Label each bag with the species scientific name, date of harvest, date of storage, percent purity, percent weed seed and germination rate.

Seed Testing and Certification

Seed must be tested for germination rate, purity, and presence of weed seeds. A pregermination tetrazolium test is strongly recommended to determine the total percentage of viable seed. Seed testing should be conducted by a seed testing facility approved by the Association of Official Seed Analysts (AOSA).

Florida ecotypes of Goldenmane Tickseed need to be certified as to the county of origin by the Southern Seed Certification Association, Inc., P.O. Box 2619, Auburn, AL 36831 (334-844-4995). The SSCA is a joint Florida/Alabama agency.

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Additional Notes:

3. Pure Live Seed (PLS) = (pounds of bulk seed x percent purity of the seed x percent germination*)/10,000; ex: 10.8 lb PLS = 20 lb bulk seed x 90% pure x 60% germination/10,000.

* Percent of total seed that is viable as determined by a tetrazolium test can be substituted for percent germination.