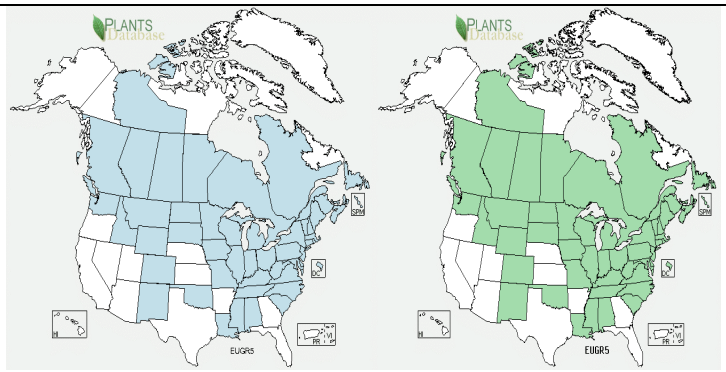
Plant Propagation Protocol for *Euthamia graminifolia*
ESRM 412 – Native Plant Production

(Picture from source 10)

TAXONOMY	
Family Names	
Family Scientific Name:	Asteraceae
Family Common Name:	Aster family
Scientific Names	
Genus:	*Euthamia*
Species:	*graminifolia*
Species Authority:	Nutt.
Variety:	
Sub-species:	
Cultivar:	
Authority for Variety/Sub-species:	
Common Synonym(s)	*Solidago graminifolia* (6)
Common Name(s):	Common goldentop (2) Grass-leaved goldenrod (1) Flat-top goldentop (4) Flattop goldentop (4)
Species Code	EUGR5
above information was obtained from USDA plant database (3)	
GENERAL INFORMATION	

Geographical range	 Blue states represent where the plant is native to Green states represent presence of the species White states represent absence of the species (3)
Ecological distribution	sandy, gravelly, clay, shores, ditches, fields, interdunal flats, beach pools, exposed lake, clearings, borrow pits (near water table) fens, wet prairies, conifer swamps, lowland forest, meadows, rock crevices. (1) Damp to drier thickets and open ares (5) Moist sunny places (7,8) Meadows, shores, moist black soil prairies, edges of marshes, sandy panes between dunes, calcareous seeps, ditches, railroads. (8)
Climate and elevation range	Of know examples of plant communities with Euthamia graminifolia elevation range from 260-1427 feet.
Local habitat and abundance; may include commonly associated species	Some commonly associated species: *Achillia millefolium, Achillea ptarmica, Adenocaulon bicolor, cirsium vulgare, Crepis runcinata, Erigeron acris, Grindelia squarrosa, Helianthus annuus, Lygodesmia juncea, Petasties vitifolius, Senecio canus, Solidago gigantean, solidago missouriensis, Tragopodium dubius, tragopogon pratensis* (for complete list refer to 6) Can be found commonly in wetland areas (8) Species not threaten (3)
Plant strategy type / successional stage	Prolific vegetation reproduction (1) Perennial and spreads by rhizomes (5,8) Can spread aggressively in moist sunny places (8)
Plant characteristics	Perennial (1,5,8) Herb that is 3-6 feet tall (5) 1-4 feet (7) 2-3.5 feet (8)

	Stems: Slender and branching is variable (8) Leaves: Narrow and grass-like (5), alternate leaves linear with smooth margins (8), 3 large conspicuous veins (8). Flowers: in clusters that are 3-5 mm high (6), often coated with sticky gum (6) and yellow (5). The clusters are flat-headed but sometimes round (8). It is 1/8" in diameter (8). Roots: rhizomes, fibrous, and form colonies (5,8) Key characteristics: floral arrangement and narrow (8) Leaves are distinctive. (5) sometimes pubescent (8) Leaves emit carrot odor when crushed (6) Mild floral scent (8)  (picture from source 6)
PROPAGATION DETAILS	
Ecotype	Locally native plants in eastern central upper peninsula in Michigan. (1)
Propagation Goal:	Plants (1)
Propagation Method:	Seed (1)
Product Type:	Container (plug) (1)
Stock Type:	Commercially produced (5) or wild (1)
Time to Grow:	N/A

Target Specifications:	The plants can be 1-6 feet in size (5,7,8)
Propagule Collection:	Seeds collected by hand (1) Cut entire seed head (1) Harvested in October and November (1)
Propagule Processing/Propagule Characteristics:	Dry seeds for 1-2 weeks in paper bags or bins (1) Can last for up to 3 years in cold store (1) Can divide rhizome when plant is dormant (5)
Pre-Planting Propagule Treatments:	Stratification: Mix seeds with perlite or vermiculite at 1:1 ratio (1) Seal in zip-lock bag or sufficient substitute (1) 1-3 months moist cold stratification (1) Stratification not absolutely necessary but increase percentage of germination. (5)
Growing Area Preparation / Annual Practices for Perennial Crops:	In greenhouse (1) • Film is standard U.V. 3 HL clear 6 mil • Continuous air circulation • Cool in the summer months Container (1) • 24 cell 2” dimater 14”x8.5”x4” deep flats. • Can be grown in any plug size Media (5) • Scotts Redi-earth Plug and Seedling mix • Additive: vermiculite and sphagnum peat moss • Sterilize the soil • Moist soil (5,8) • Should contain high amounts of organic material (8) Light requirement • Full Sun (5,8) Notes: can tolerate drier conditions, nearly drought tolerant (8).
Establishment Phase :	Temperature • Jan.-Aug. at 65 degrees F (night and day) • 100 degrees F during the day in summer • Sept.-Dec. at 55 degrees F • Temperature is the same at all stages of growth • Keep the soil damp during germination • No artificial light required (information from source 1)

Length of Establishment Phase:	N/A
Active Growth Phase:	Cooler ambient temperatures Soil does not need to be kept moist No fertilizer required (Information from source 1)
Length of Active Growth Phase:	N/A
Hardening Phase:	In early-late spring mature plants can be moved to cold frame Water less frequently (1)
Length of Hardening Phase:	From early-late spring until danger of frost past (1)
Harvesting, Storage and Shipping of seedlings:	Seeds can be commercially produced (5)
Length of Storage of seedlings, between nursery and outplanting:	At least for 1 season (1)
Guidelines for Outplanting / Performance on Typical Sites:	Flowers from July to September (1) Species can be planted successfully on many variable sites (1) Transplanted from late May to early October (1) Blooms: July, August, and September (5) lasting about 1 month (8)
Other Comments:	Attracts butterflies and hummingbirds. Very hardy when transplanted by plug. (1)

INFORMATION SOURCES

References (full citations):	(1) Schultz, Jan. "Untitled". Native Plant Network. May/17/2010 http://www.nativeplantnetwork.org/network/viewProtocols.aspx?ProtocolID=1583 (2) USDA, ARS, National Genetic Resources Program *Germaplasm Resources Information Network – (GRIN)* [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland. URL: http://www.ars.grin.gov/cgi-bin/npgs/html/taxon.pl?104230(17 May 2010) (3)USDA, "Plants Profile: Euthamia graminifolia". USDA. May/17/2010 http://plants.usda.gov/java/profile?symbol=EUGR5 (4) "Euthamia graminifolia (L.) Nutt.". ITIS. May/17/2010 <http://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=37352>. (5) Lady Bird Johnson Wildflowe center, "Native Plant Database: Euthamia graminifolia (L.) Nutt.". University of Texas at Austin. May/17/2010

	<http://www.wildflower.org/plants/result.php?id_plant=EUGR5>. (6) Brent, Johner. "Flat-top Goldenrod". Talk about Wildlife. May/17/2010 <http://talkaboutwildlife.ca/profile/index.php?s=1336>. (7) Connecticut Botanical Society, "Lance-leaved Goldenrod (Flat-topped Goldenrod)". Connecticut Botanical Society. May/17/2010 <http://www.ct-botanical-society.org/galleries/euthamiagram.html>. (8) John, Hilty. "Grass-Leaved Goldenrod". Prairie Wildflowers of Illinois. May/17/2010 <http://www.illinoiswildflowers.info/prairie/plantx/gr_goldenrodx.htm>. (9) "Riverside Ice Meadow". New York Natural Heritage Program. May/17/2010 <http://www.acris.nynhp.org/report.php?id=10009>. (10) Semple, J.. "Euthamia (Nutt)". Aster Graphics. 05/18/2010 <http://www.jcsemple.uwaterloo.ca/Euthamia_graminifolia.jpg>.
Other Sources Consulted (but that contained no pertinent information) (full citations):	Byers, E. A., Vanderhorst, J. P., & Streets, B. P. (2007). *Classification and conservation assessment of high elevation wetland communities in the Allegheny Mountains of West Virginia*. Elkins, W.Va: W.Va. Division of Natural Resources, Wildlife Resources Section. Native American Ethnobotany, "A database of foods, drugs, dyes and fibers of native american peoples, derived from plants". University of Michigan. May/17/2010 <http://herb.umd.umich.edu/>.
Protocol Author):	Kevin Nguyen
Date Protocol Created	May/18/2010

Note: This template was modified by J.D. Bakker from that available at:
http://www.nativeplantnetwork.org/network/SampleBlankForm.asp