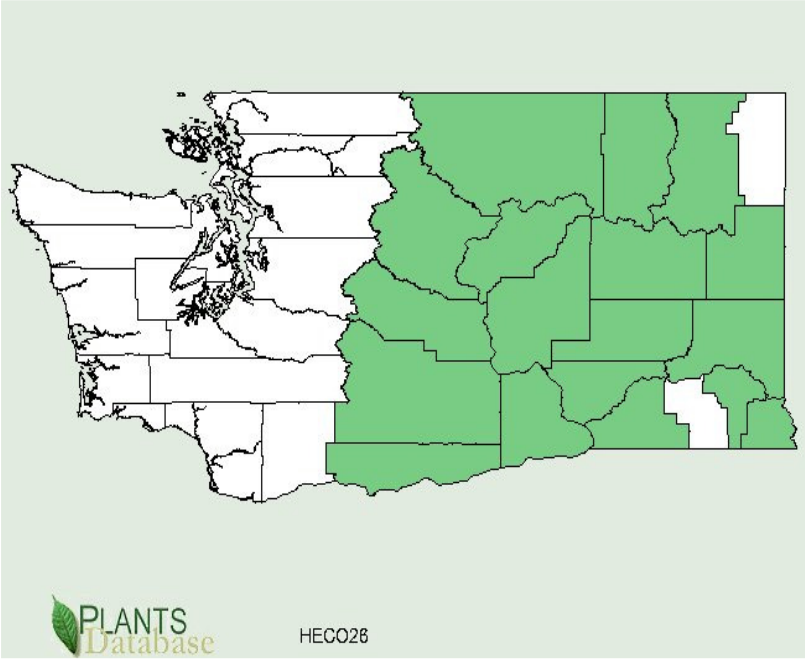
Plant Propagation Protocol for *Hesperostipa comata*
ESRM 412 – Native Plant Production

Photo credit: Sally & Andy Wasowski

TAXONOMY	
Family Names	
Family Scientific Name:	Poaceae (Gramineae)
Family Common Name:	Grass family
Scientific Names	
Genus:	*Hesperostipa*
Species:	*comata*
Species Authority:	(Trin. & Rupr.) Barkworth
Variety:	
Sub-species:	
Cultivar:	
Authority for Variety/Sub-species:	
Common Synonym(s)	*Stipa comata*
Common Name(s):	Needle-and-thread, speargrass
Species Code (as per USDA Plants database):	HECO26

GENERAL INFORMATION	
Geographical range:	Throughout the western and midwestern USA and Canada (USDA 2012). In Washington, *H. comata* is restricted to areas east of the Cascade mountains (WTU Image collection 2012).



Maps courtesy of USDA Plants Database
http://plants.usda.gov/java/profile?symbol=HECO26&mapType=large&photoID=

Ecological distribution:	Widely distributed; occurring on dry, sandy or gravelly plains or prairies, and in the foothills and montane forests of the western USA (Hitchcock & Cronquist 1973; Zlatnik 1999)
Climate and elevation range	Very drought tolerant; *H. comata* is found in areas with annual precipitation as low as 5 inches; most commonly occurs in 7-16 inch precipitation zones (Ogle *et al.* 2006). Occurs at elevations as low as 1000 ft, most commonly between 3500 to 8500 ft (Ogle *et al.* 2006)
Local habitat and abundance; may include commonly associated species	In the Pacific Northwest *H. comata* is commonly associated with bluebunch wheatgrass, Idaho fescue, and bluegrass plant communities (Ogle *et al.* 2006).
Plant strategy type / successional stage (stress-tolerator, competitor, weedy/colonizer, seral, late successional)	*H. comata* is an early colonizer of disturbed, sandy sites. It is a cool season grass with growth beginning in early in spring; it then goes dormant in early to mid summer (Ogle *et al.* 2006). *H. comata* depends on seeds for reproduction (Ogle *et al.* 2006) and forms a relatively abundant and persistent seed bank in shrub-steppe environments—about 49% of seeds in the seedbank are viable (Clements *et al.* 2007).
Plant characteristics:	A perennial, tufted bunchgrass, 1-4 ft tall, *H. comata* is characterized by elongate, narrow seeds with exceptionally long, twisted (geniculate) awns (3-5 inches). Leaves are involute, 8-12 inches long. Inflorescence is a terminal panicle, usually contracted, of one-flowered spikelets (Hitchcock & Cronquist 1973; Barkworth 1993; Ogle *et al*. 2006).
PROPAGATION DETAILS	
Ecotype:	--
Propagation Goal:	Seeds
Propagation Method:	Seeds
Product Type:	Propagules (seeds)
Stock Type:	--
Time to Grow:	About 4 months
Target Specifications:	Harvest yield depends on age of stand and weather. Reported average annual production ranges from 38 to 150 lbs/ac under irrigated conditions (Winslow 2002; Ogle *et al.* 2006).
Propagule Collection:	Seed is difficult to harvest due to sharp, hard

	awns. Hand harvest in wildland areas in late July to mid August when the caryopsis is light brown and seed is at the hard dough stage, but before shattering of seedheads (Winslow 2002)
Propagule Processing/Propagule Characteristics:	Spread seeds out on tarp in dry, protected area for about 3-5 days, turning daily. Processing is complicated because awns get intertwined, reducing seedflow (Ogle *et al.* 2006; Winslow 2002) and the elongate, narrow seeds are easily damaged (Barner 2009). Thresh with a hammermill through a 12/64" screen to de-awn and separate seeds from coarse debris. Threshed material can be further cleaned using an air screen cleaner (Winslow 2002). Seed density is approximately 115,000 seeds per pound (Ogle *et al.* 2006).
Pre-Planting Propagule Treatments:	The dormancy requirements of seeds of this species are not well understood. Baskin & Baskin (1998) reported that no pretreatment of seeds are necessary prior to planting, but other researchers have reported poor and/or variable germination and emergence, between 20 and 75% (Noller 2001). Seeds benefit from a period of after-ripening; seeds older than 2 years germinate more readily (Ogle *et al.* 2006). No prechilling appears to be needed to break dormancy (Ogle *et al.* 2006). Greenhouse experiments have indicated that optimum germination occurs at a root-zone temperature of 27°C (about 70% germination, compared to <1% at 7°C) (Smoliak & Johnston 1968). Dormancy requirements likely depends on the ecoregion from which the seeds were collected (Ogle *et al.* 2006). Both mechanical (Butler & Frieswyk 2001) and acid scarification (Young &Young 1986) of the outer seed coating reportedly improves germination.
Growing Area Preparation / Annual Practices for Perennial Crops:	Seeds are sown in a seedbed or field. Seed fields remain productive for about 4 to 5 years (Ogler *et al.* 2002)

Establishment Phase:	Seeds can be direct sown in a seedbed during spring, or as a dormant planting in fall. Sow in rows 25-30 seeds/ft; row spacing 24-36" under irrigation (Winslow 2002; Ogle *et al.* 2006). Optimum seeding depth is about ¾" for loamy soils, about ½" for clay soils and up to 1" for sandy soils (Ogle *et al.* 2006). Soil surface should be kept moist during germination and emergence (Winslow 2002). Seedbeds should be kept free of weeds to reduce competition (Ogle *et al.* 2006); fertilizer application is not recommended during the first year as it promotes weed growth (Winslow 2002).
Length of Establishment Phase:	14 days (Winslow 2002)
Active Growth:	Continue to control weeds. Soil should be kept moist during boot stage, milk stage of seed development, and after harvest. Do not irrigate during flowering. Fertilize with N and P in mid-September (Winslow 2002).
Length of Active Growth Phase:	About 4 months
Hardening Phase:	Not applicable
Length of Hardening Phase:	Not applicable
Harvesting, Storage and Shipping:	Seed can be harvested by direct combining, or by windrowing followed by combining, during late summer when in the hard-dough stage (Ogle *et al.* 2002). Seeds should be dried immediately (moisture content should be less than 15%) and stored in woven plastic bags (sharps seeds get caught in burlap or cotton bags) in a cool, dry environment (Winslow 2002; Ogle *et al.* 2006).
Length of Storage:	7 to 10 years (Winslow 2002)
Guidelines for Outplanting / Performance on Typical Sites:	Direct seed at outplanting site during spring, or as a dormant planting in fall. Recommended seeding rate is 6 pounds PLS/acre (Ogle *et al.* 2006). Optimum seeding depth is about ¾" for loamy soils, about ½" for clay soils and up to 1" for sandy soils (Ogle *et al.* 2006). Variable, and frequently low, emergence and survival have been reported for *H. comata* sown at outplanting sites (Humphrey & Schupp 1999; Link *et al.* 2011).
Other Comments:	Where appropriate, baled windrows can be stored

	in a dry area and used as mulch on planting sites. Changes in humidity will cause awns on shattered seeds to twist, imbedding seeds in the soil (Winslow 2002; Ogle *et al.* 2006).

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