


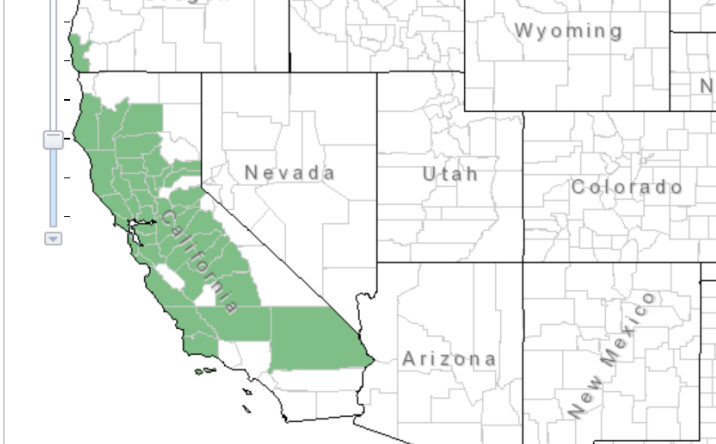
Plant Propagation Protocol for *Triteleia laxa*

ESRM 412 – Native Plant Production

Protocol URL: <https://courses.washington.edu/esrm412/protocols/TRLA16.pdf>



TAXONOMY	
Plant Family	
Scientific Name	Liliaceae
Common Name	Lily Family
Species Scientific Name	
Scientific Name	<i>Triteleia laxa</i> Benth
Varieties	
Sub-species	
Cultivar	
Common Synonym(s)	<i>Brodiaea laxa</i> (Benth.) S. Watson <i>Brodiaea laxa</i> (Benth.) S. Watson var. <i>candida</i> (Greene) Jeps. <i>Brodiaea laxa</i> (Benth.) S. Watson var. <i>nimia</i> Jeps. <i>Brodiaea laxa</i> (Benth.) S. Watson var. <i>tracyi</i> Jeps. <i>Triteleia angustiflora</i> A. Heller ¹
Common Name(s)	Ithuriel's Spear ¹ , Grass nuts, Indian potato, Deer potato, Highland potato ³ , Wally basket ² , Humbolt Star, Sierra Giant ⁴ .
Species Code (as per USDA Plants database)	TRLA16
GENERAL INFORMATION	
Geographical range	Southwestern Oregon, the Cascade Range, Northwestern California, central Western California, the Sierra Nevada, and the Transverse Ranges ³ . A map of the distribution across North America (and the respective counties) are provided below:

	<p><u>North America Distribution¹:</u></p>  <p><u>County Distribution¹:</u></p> 
Ecological distribution	<p>Grows on heavy soils in grassland or brush².</p> <p>Open forests, mixed conifer or foothill woodlands, and grasslands on clay soils⁵.</p>
Climate and elevation range	<p>Climate: open forest, woodland, and grasslands with clay soil; often prefers warmer temperature regions of the West coast³.</p> <p>Elevation: 0 – 1500m³</p>
Local habitat and abundance	<p>In a natural setting, <i>T. laxa</i> is often found in open places, including meadows, grasslands, and most commonly in woodland areas. It also lives in warmer temperature regions of the West coast and thus has a relatively low water requirement⁴.</p>

	This species grows well in both sandy and clay soils, however, it prefers a sandy loam soil texture with medium to slow drainage ⁴ .
Plant strategy type / successional stage	Not shade tolerant ⁵ . <i>T. laxa</i> primarily grows from underground annual corms, which are replaced every year. They also experience a dormant phase during the summer where the old corm dries out; this dormancy is broken with the first fall rains, which initiate new corm development ⁶ .
Plant characteristics	Perennial herb with blue to blue-purple to white, funnel shaped flowers in open, large umbels (8-48 flowers per umbel) with six petal-like lobes. Flowering occurs between the months of April and June, and mature individuals can reach heights of up to 28 in ² . There are also two to three basal grass-like leaves that wither while the plant is flowering. <i>T. laxa</i> is hermaphroditic—contains both female and male organs—and is often insect pollinated ⁵ , however, this species can reproduce both through black seeds and fibrous-coated tan colored corms ³ . Corms have tightly attached cormlets, and the fruit is a capsule, since <i>T. laxa</i> is a geophyte that is related to lilies and onions; the corm is edible ⁴ .

PROPAGATION DETAILS

Ecotype	
Propagation Goal	Bulbs
Propagation Method	Vegetative
Product Type	
Stock Type	Corms
Time to Grow	7 months ⁷
Target Specifications	First year bulb ranging from 3-8mm in diameter ⁷
Propagule Collection Instructions	
Propagule Processing/Propagule Characteristics	Corm size: < 4mm diameter ⁸ Corm density: 1.1 -2.5 g/corm or more ⁸
Pre-Planting Propagule Treatments	
Growing Area Preparation / Annual Practices for Perennial Crops	
Establishment Phase Details	Plant corms in the fall in full sun or partial shade and place corms 2-4in apart and 4in deep. Corms will offset

	<p>more when not overcrowded, and well-drained soil tends to produce bigger corms³.</p> <p>Throughout the establishment phase, keep ground slightly damp, but do not overwater; excess water will cause corms to rot³.</p>
Length of Establishment Phase	Plants should be well established after about one year ³ .
Active Growth Phase	Once fruit and seed production—formation of a new corm—have occurred the leaves and scape will dry up and all aboveground activity of the plant ceases during the hot/dry summer months. Fall conditions will initiate root/corm growth for the upcoming season, fall rains will also cause the start of seed germination ⁸ .
Length of Active Growth Phase	
Hardening Phase	Flowering sized bulbs can be collected and divided in autumn ⁹ , where the separated plant divisions can be plant independently.
Length of Hardening Phase	
Harvesting, Storage and Shipping	
Length of Storage	
Guidelines for Outplanting / Performance on Typical Sites	
Other Comments	
PROPAGATION DETAILS⁷	
Ecotype	Seeds collected at the Nature Conservancy's Vina Plains and Dye Creek Preserves, Tehama County, California.
Propagation Goal	Bulbs
Propagation Method	Seed
Product Type	Container (plug)
Stock Type	Potted nursery stock
Time to Grow	7 months
Target Specifications	First year bulb: 3-8mm in diameter
Propagule Collection Instructions	Whole fruits can be collected immediately prior to or after ripening. Shake split capsules—mechanically split if not already split (large quantities can be done in a blender)—to remove the seeds. Blending may increase viability by shattering brittle and readily unviable seeds. Sift and/or blow off chaff to clean seeds
Propagule Processing/Propagule Characteristics	<p>Collect seeds from May-June (sometimes July).</p> <p>Seed density: 300-400 seeds / gram</p>

Pre-Planting Propagule Treatments	<p>No dormancy techniques are required.</p> <p>Cleaning, drying, and storing seeds/fruits in a cold place is advised.</p>
Growing Area Preparation / Annual Practices for Perennial Crops	<p>Seeds should be sown into 1.5” deep flats filled with 1:1:1:2 sand: pumice: peat moss: fir bark mixture, and place in an outdoor cold frame from late-fall through spring.</p> <p>Active growing season occurs from the first fall rains through the spring/summer dry-down. Annually, plants should be allowed to go dormant during the summer months. Dormancy can be induced if pots are left to dry-down and then placing them in dry storage until the next rain.</p> <p>Improved growth can be obtained by avoiding transplanting (first year), and planting in native-like soil—sandy loam—after the first year. However, loamy soil can reduce growth in the first year due to lower fluctuations in moisture and temperature.</p>
Establishment Phase Details	<p>Germination time: 2 weeks</p> <p>Germination rates: 97% (seed cold, moist stratified in vermiculite at 44°F for less than 1-3 months) 45-72% (seed sown in outdoor coldframes)</p>
Length of Establishment Phase	3-4 weeks (transplantable sprout)
Active Growth Phase	Onset of active growth phase occurs with start of the rainy season, which causes seed swelling, and continues through late spring/early summer until dry-down occurs.
Length of Active Growth Phase	6-8 months (late fall – early summer)
Hardening Phase	No hardening is necessary; growth starts with fall rains and plants die back by the late spring/early summer
Length of Hardening Phase	
Harvesting, Storage and Shipping	Dormant individuals can be collected after the dry-down and can be placed in dry storage (60-70°F)
Length of Storage	3-5 months (dormant individuals)
Guidelines for Outplanting / Performance on Typical Sites	
Other Comments	
PROPAGATION DETAILS	

Ecotype	
Propagation Goal	Plants
Propagation Method	Seed
Product Type	6-inch pots
Stock Type	Seed
Time to Grow	2-5 years to ultimate height ¹⁰
Target Specifications	0.5m (20in) by 0.1m (4in) ⁵
Propagule Collection Instructions	Seeds ripen in August ⁵ Seed collection: May – July ⁷
Propagule Processing/Propagule Characteristics	Seed mass: 1.7 mg (Average) ⁸
Pre-Planting Propagule Treatments	No stratification is required, but 8 weeks of cold stratification is recommended to get high germination rates (80-90%) ⁸ . Store seeds in a paper sack kept in cool conditions until autumn ³ .
Growing Area Preparation / Annual Practices for Perennial Crops	Plant seeds before the first of October ³ or within a reasonable window of the first fall rains. Place seeds in six-inch pots with 100 seeds/pot. Leave seeds on top of the soil—as the corm develops it will pull itself to appropriate depth—and sprinkle a small amount of soil over them. Add ¼-in of gravel on top ³ .
Establishment Phase Details	Germination occurs within 1-3 months at 15°C ⁵ and have an observed germination rate of 80-90% ⁸ . Media should be kept moist throughout establishment phase; however, seedlings are prone to damping-off ⁵ ; caution should be taken to prevent overwatering.
Length of Establishment Phase	1-3 months ⁵
Active Growth Phase	Care for plants for 2 years before outplanting, maintaining the soil at slightly damp levels and fertilizing in late winter and early spring to protect from herbivory (if kept outdoors) ³ .
Length of Active Growth Phase	2 years
Hardening Phase	After the second year separate the pots into individual plants and transplant into the ground (or larger outdoor pots) in the fall while the corms are dormant ³ . Grow plants for an additional year or two until bloom, these can then be outplanted in the following autumn ³ .

Length of Hardening Phase	1-2 years ³
Harvesting, Storage and Shipping	
Length of Storage	3-5 months (dormant individuals) ⁷
Guidelines for Outplanting / Performance on Typical Sites	Outplant corms to the desire site in autumn (prior to the first fall rains) ³ . <i>T. laxa</i> is suitable for light, sandy; medium, loamy; and heavy, clay soils, but prefers well-drained media. This species is also tolerant of acidic, neutral, and alkaline soils ⁵ .
Other Comments	
INFORMATION SOURCES	
References	See endnotes below
Other Sources Consulted	See consultation list below
Protocol Author	Jordan Drugge
Date Protocol Created or Updated	06/03/2018

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