Plant Propagation Protocol for *[B. pilularis]*

ESRM 412 – Native Plant Production

Protocol URL: https://courses.washington.edu/esrm412/protocols/*[USDASpeciesCode.pdf]*

TAXONOMY	
Plant Family	Sunflower Family
Scientific Name	Asteraceae
Common Name	Coyotebrush
Species Scientific Name	B. pilularis
Scientific Name	Baccharis pilularis DC.
Varieties	consanguinea
Sub-species	
Cultivar	Twin Peaks
Common Synonym(s)	Baccharis pilularis DC. var. consanguinea (DC).
Common Name(s)	Coyotebrush
Species Code (as per USDA Plants database)	BAPI
GENERAL INFORMATION	
Geographical range	Coyote bush occurs in the outer Coast Ranges from northern Baja California, Mexico, and San Diego County, California, north to Tillamook County, Oregon. The species also occurs in the Channel Islands and as isolated populations in the Cascade and Sierra Nevada foothills from Butte County to Tuolumne County, California. 2
Ecological distribution	Coyote brush can be found on sea cliffs and bluffs as well as sand dunes and thickets along the coast. It prefers open, dry sites and resides in dry forest and shrub habitats. In Washington, coyote brush grows in two habitats. One habitat is comprised of basalt sea cliffs with south-southwestern exposure. The second habitat is made up of recently accreted sand dunes below the sea cliffs. These areas are open and often among red alder trees. 1,2
Climate and elevation range	Coastal populations of the prostrate form of coyote bush experience moderate temperatures with summer fog, seaspray, and heavy onshore winds. Annual precipitation ranges from 9.8 to 17.7 inches (250-450 mm), with most falling between November and April. Inland populations, which occur up to 2,460 feet (750 m) (occasionally up to 4,920 feet (1500 m)), are exposed to colder winters and hotter summers. Annual precipitation in these habitats ranges from 12 to 30 inches (305-762 mm). 2 Elevation ranges from 0 to 2461 ft (0 to 750 m), but sometimes reaches 4921 ft (1500 m). 2

Local habitat and abundance	The Washington population ranges from 10 to 400 ft (3 to 122 m) in elevation. 2
Plant strategy type / successional stage	Coyote bush is a shade-intolerant species. Along with other small-seeded coastal sage shrubs, it colonizes actively eroding or alluviating areas such as dunes and gravel bars. Exposed mineral soil gives coyote bush an advantage over perennial grasses and chaparral shrubs. Coyote bush's successional status varies with habitat type. In California grasslands, it is a late seral species that invades and increases in the absence of fire or grazing. Coyote bush is a common dominant in coastal sage scrub, but because seedling growth is poor in shade, coyote bush does not regenerate under a closed shrub canopy. 2
Plant characteristics	Active growth period during spring and summer, moderate growing, decumbent thicket forming, 3ft tall shrub. Yellow flowers with green foliage and brown fruit. 2
PROPAGATION DETAILS	
Ecotype	Marin County, California
Propagation Goal	Plants
Propagation Method	Seed
Product Type	Container (plug)
Stock Type	Deepot 16
Time to Grow	Seedlings are transplanted 14 days after germination to individual containers 2"x7" tubes (Deepot 16)
Target Specifications	Height: N/A Caliper: N/A Root System: Firm plug in container.
Propagule Collection Instructions	Seeds are collected between August 1st and December 1st. Mature inflorescences are white. Pappus is white and Seeds are dark brown at maturity; light colored seeds are immature and will not germinate. Seeds are less than 1 mm long.
Propagule Processing/Propagule Characteristics	Seed Cleaning: Seeds are rubbed over a screen. Seed Storage: Seeds are refrigerated and kept dry.
Pre-Planting Propagule Treatments	Not required
Growing Area Preparation / Annual Practices for Perennial Crops	Fully Controlled Greenhouse. Sowing Method: Transplanting Germinants. 4 grams of seeds are sown per flat containing Sunshine Mix #4 Aggregate Plus (peat moss, perlite, major and minor nutrients, gypsum, and dolomitic lime). Seeds are lightly mixed with media to sow and are surface sown. Flats are watered in with an automatic irrigation system.

	Seeds are sown on August 15th. % Germination:50%
Establishment Phase Details	Seeds germinate 14 days after sowing. Seedlings are transplanted 14 days after germination to individual containers 2"x7" tubes (Deepot 16) containing standard potting mix of peat moss, fir bark, perlite, and sand. Transplant Survival averages 95%.
Length of Establishment Phase	1 month
Active Growth Phase	After transplanting Plants are moved to the shade house for continued growth. Prune plants one month after transplanting to promote branching.
Length of Active Growth Phase	2 months
Hardening Phase	Coyote brush grows actively and blooms over the winter
Length of Hardening Phase	Coyote brush grows actively and blooms over the winter
Harvesting, Storage and Shipping	Seeds are collected between August 1st and December 1st. Mature inflorescences are white. Pappus is white and Seeds are dark brown at maturity; light colored seeds are immature and will not germinate. Seeds are less than 1 mm long. Seed Cleaning: Seeds are rubbed over a screen. Seed Storage: Seeds are refrigerated and kept dry.
Length of Storage	N/A
Guidelines for Outplanting / Performance on Typical Sites	Autumn planting is recommended for California.
Other Comments	Use of male coyotebrush in plantings prevents seed production and the potential for invasiveness, with abundant floral resources over the winter.
INFORMATION SOURCES	
References	Hansen, W. Native Plants of the Northwest. http://www.nwplants.com. May 10, 2006 Smither-Kopperl, Margaret. "Propagation Protocol." USDA NRCS. USDA, n.d. Web. 23 Apr. 2014. http://www.il.nrcs.usda.gov/Internet/FSE_PLANTMATERIALS/publications/capmcmt11430.pdf USDA Forest Service. Fire Effects Information System. http://www.fs.fed.us. May 10, 2006 USDA. "USDA Plant Profile." *USDA NRCS*. USDA, 2014. Web. 23 Apr.

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Other Sources	
Protocol Author	James Day
Date Protocol Created or Updated	04/23/2014

(ORIGINAL PROTOCOL)
Plant Data Sheet


Species (common name, Latin name)

Coyote bush, coyote brush, baccharis, chaparral broom, dwarf baccharis
Baccharis pilularis

Range

Coyote bush occurs in the outer Coast Ranges from northern Baja California, Mexico, and San Diego County, California, north to Tillamook County, Oregon. The species also occurs in the Channel Islands and as isolated populations in the Cascade and Sierra Nevada foothills from Butte County to Tuolumne County, California. [2]

Climate, elevation

Coastal populations of the prostrate form of coyote bush experience moderate temperatures with summer fog, seaspray, and heavy onshore winds. Annual precipitation ranges from 9.8 to 17.7 inches (250-450 mm), with most falling between November and April. Inland populations, which occur up to 2,460 feet

(750 m) (occasionally up to 4,920 feet (1500 m)), are exposed to colder winters and hotter summers. Annual precipitation in these habitats ranges from 12 to 30 inches (305-762 mm). [2]

Elevation ranges from 0 to 2461 ft (0 to 750 m), but sometimes reaches 4921 ft (1500 m). The Washington population ranges from 10 to 400 ft (3 to 122 m) in elevation. [2]

Local occurrence (where, how common)

Coyote brush is known in Washington from only one site in the southwestern part of the state. [2]

Habitat preferences

Coyote brush can be found on sea cliffs and bluffs as well as sand dunes and thickets along the coast. It prefers open, dry sites and resides in dry forest and shrub habitats. In Washington, coyote brush grows in two habitats. One habitat is comprised of basalt sea cliffs with south-southwestern exposure. The second habitat is made up of recently accreted sand dunes below the sea cliffs. These areas are open and often among red alder trees. [1,2]

Plant strategy type/successional stage (stress-tolerator, competitor, weedy/colonizer, seral, late successional)

Coyote bush is a shade-intolerant species. Along with other small-seeded coastal sage shrubs, it colonizes actively eroding or alluviating areas such as dunes and gravel bars. Exposed mineral soil gives coyote bush an advantage over perennial grasses and chaparral shrubs. Coyote bush's successional status varies with habitat type. In California grasslands, it is a late seral species that invades and increases in the absence of fire or grazing. Coyote bush is a common dominant in coastal sage scrub, but because seedling growth is poor in shade, coyote bush does not regenerate under a closed shrub canopy. [2]

Associated species

Common associates include sitka spruce (*Picea sitchensis*), salmon berry (*Rubus spectabilis*), sword fern (*Polystichum munitum*) salal (*Gaultheria shallon*), pacific reed grass (*Calamagrostis nutkaensis*), red fescue (*Festuca rubra)*, brome fescue (*Vulpia bromoides)*, velvet grass (*Holcus lanatus*), stone-crop (*Sedum spathulifolium)*, and oceanbluff bluegrass (*Poa unilateralis)*,
American dunegrass (*Leymus mollis*), velvet grass (*Holcus lanatus*), lodgepole pine (*Pinus contorta* ssp*. contorta*), European beachgrass (*Ammophila arenaria)*, sweet vernal grass (*Anthoxanthum odoratum*), and red alder (*Alnus rubra)*. [1,2]

May be collected as: (seed, layered, divisions, etc.)

Seed. [2]

Collection restrictions or guidelines

Seed can be collected with a cloth and is best if dried in a warm ventilated room or in sun without wind. Sometimes the pappus is removed before planting. In nurseries, seeds are sown in fall or early spring using sandy soil or a vermiculite, perlite, and sphagnum moss mix. [2]

Seed germination (needs dormancy breaking?)

Coyote bush seed germinates well on mineral soil and has no stratification or temperature requirement. [2]

Seed life (can be stored, short shelf-life, long shelf-life)

Seed may be stored. [2]

Recommended seed storage conditions
After drying, seed can be stored in a sealed refrigerated container. [2]

Propagation recommendations (plant seeds, vegetative parts, cuttings, etc.)
It can be established from seed or bare root plantings. [2]

Soil or medium requirements (inoculum necessary?)
Coyote bush occurs on a range of soil types but is best adapted to medium- to coarse-textured soils. [2]

Installation form (form, potential for successful outcomes, cost)
Restoration projects where coyote bush is planted from containers are most successful in the long term if a sex ratio of 1:5 (males to females) is used. Cost is relatively inexpensive. [2]

Recommended planting density
Root growth rates are very fast (average of 10 times faster than shoot growth) so plants should be planted fairly spread apart.[2]

Care requirements after installed (water weekly, water once etc.)
Does not require much water, but regular watering will increase its resistance to fire. [2]

Normal rate of growth or spread; lifespan
Coyote bush seed is generally dispersed from October to January. Germination occurs after late fall or early winter rains. Coyote bush growth is slow until about March, when root and shoot growth rates increase with warmer temperatures and spring rains. Growth slows with declining soil moisture in late May. Plants flower from July to October, and fruit ripens from September to November. Rains in September typically allow a high rate of leaf addition. Seasonal development is slightly later in inland than in coastal populations. [2]

Sources cited
[1]Hansen, W. Native Plants of the Northwest. http://www.nwplants.com. May 10, 2006
[2] USDA Forest Service. *Fire Effects Information System*. http://www.fs.fed.us. May 10, 2006

Data compiled by (student name and date)
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