



Native Plant Network Propagation Protocol Database

Protocol Information

NOTE: This Protocol has not yet been approved for publication.

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Opuntia (littoralis)

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- Family Scientific Name: Cactaceae
Family Common Name: Cactus
Scientific Name: *Opuntia littoralis* (Engelm.) Cockerell
Common Name: coast prickly pear
Species Code: OPLI3
Ecotype: coastal sage scrub, chaparral
General Distribution: *Opuntia littoralis* is native to southern California and Baja California. Plants occur in dense clumps and can occupy a variety of habitats including coastal sage scrub and chaparral.
Known Invasiveness: Horticultural varieties of *Opuntia ficus-indica* are known to be invasive in Australia.
Propagation Goal: Plants
Propagation Method: Vegetative
ProductType: Container (plug)
Stock Type: Shallow 8" Pot
Time To Grow: 6 – 8 months
Target Specifications: Our goal was to propagate 7000 rooted *Opuntia* individuals approximately 2 ft (with at least three pads) for the purpose of restoration outplanting in San Diego County to augment nesting habitat for the coastal cactus wren.
Propagule Collection: We removed pads from mature plants by twisting at the joint of two pads with tongs. We collected pads from native source populations of *O. littoralis* from a variety of locations around San Diego County. We selected young, fully expanded pads from near the top of the plant as propagules.
Pre-Planting Treatments: We stored pads horizontally in bins until processing. To heal the wound created by collection, we "calloused" pads by laying them in the sun on shade cloth for week to dry. Longer drying times may be necessary in high humidity environments. Note that if pads are left to callous for too long, they will begin to root in the ground or curve toward the sun.
Growing Area Preparation/
Annual Practices for Perennial Crops: Growing Environment: We constructed an open air nursery for growing cactus in pots. We installed weed cloth beneath pots to prevent the plants from rooting and to prevent weeds from invading the pots.

Growth Media: Sunshine mix #4 with additional perlite. Any well drained potting soil would likely be appropriate. A previous project at our institution did not have success growing *Opuntia* directly in decomposed granite substrate.

Potting Procedure: We planted pads vertically in shallow 8" pots with the callous pointing toward the bottom of the pot. We planted pads to a depth that allowed the pot to stay upright.

Pot Spacing: We placed pots immediately adjacent to each other on the weed-cloth covered ground of the nursery, a practiced which helped support top heavy cactus as they grew. For inventory purposes, we organized pots in groups of 50.

Watering: During establishment (while plants were rooting), we watered pots once weekly, always allowing pots to dry fully between waterings. After cactus were established, we watered biweekly. We used overhead watering techniques, as drip-line watering seemed to increase the frequency of cochineal scale in past projects.

Pest Control: When cochineal scale was present, we used high-pressure overhead spraying for both watering the cactus and removing any cochineal scale. A previous project that used drip-line rather overhead watering had a larger problem with cochineal scale. We also established a four-meter-wide, weed-free barrier surrounding all sides of the cactus growing area at the nursery to reduce the chance of weed seeds germinating in cactus propagule pots, and discourages snails from invading the nursery area.

Other Maintenance: When present, we removed flowers from pads to promote pad growth.

Establishment Phase: *Opuntia* pads should be well-rooted within 2 months (often much sooner).

Length of Establishment Phase: 2 months

Active Growth Phase: *Opuntia* pads will grow to the size of their pot and transplanting large pads may be difficult. Therefore, be sure to select the size of pot that is consistent with the size of plant you wish to plant out. In our case, the cactus in our shallow 8" pots grew to be as big as 0.5 m tall.

Length of Active Growth Phase: 4–6 months

Hardening Phase: We grew cactus in open air nursery, so hardening was not a prominent concern. We decreased watering after rooting/establishment to better simulate natural conditions.

Harvesting, Storage and Shipping: *Opuntia* can be stored in original pots with maintenance for an extended period of time. Pads may break off larger plants during transport process – so take care when loading and unloading from your truck or transport vehicle.

Outplanting performance on typical sites: For optimal restoration performance, clear the planned site of thatch or heavy weeds before planting. During planting, dig holes to the depth of potting soil, and create basins around plants to retain moisture. Tongs can be used to avoid spines while planting and handling cactus. After planting, cactus will typically dry out relative to their condition in the nursery. Of 7000 *Opuntia* planted for our project, we observed higher than 80% survivorship after the first year of outplanting across a dozen sites. Outplanted individuals should put on the new pads and flowers within the first year.

Other Comments: A previous restoration project at San Diego Zoo noted sensitivity of *Opuntia* to high pH of water and substrate.

Citation:

2018. Propagation protocol for production of Container (plug) *Opuntia littoralis* (Engelm.) Cockerell Plants Shallow 8" Pot; San Diego Zoo Institute for Conservation Research Escondido, California. In: Native Plant Network. URL: <http://NativePlantNetwork.org> (accessed 2018/07/19). US Department of Agriculture, Forest Service, National Center for Reforestation, Nurseries, and Genetic Resources.

