

# Pest Alert

## *Phytophthora tentaculata*

*Phytophthora tentaculata* has been detected in several California native plant nurseries and restoration sites. These are the first detections of *P. tentaculata* in the USA. *Phytophthora tentaculata* was initially noticed in a native plant nursery causing a severe root and crown rot in sticky monkey flower, *Diplacus aurantiacus* subsp. *aurantiacus* (Scrophulariaceae) in 2012 (figure 1). Since then it has been detected in four additional nurseries in three counties in CA in addition to three restoration sites where outplanted stock was found to be infected.

## Background

Phytophthoras, (pronounced Fie-tof-ther-uhs) which means “plant destroyers,” are water molds, fungal-like organisms that are most closely related to diatoms and brown algae (Stramenopila). The genus *Phytophthora* is large, with over 100 described species, including the sudden oak death pathogen and other destructive pathogens of agricultural, ornamental, and forest plants.

## Risk

A United States Department of Agriculture (USDA) Plant Epidemiology and Risk Analysis Laboratory (PERAL) analysis listed *P. tentaculata* as one of the top five *Phytophthora* species of concern for introduction into the United States because of both potential environmental and economic impact.

## Symptoms

*Phytophthora tentaculata* causes root rot and stem cankers, which may result in collapse and death of infected plants. The symptoms are not unique to *P. tentaculata*, rather they appear similar to infection by other *Phytophthora* species, other root and stem pathogens, or drought. Infected plants may appear undersized and off-color, with sunken lesions on the stem and discolored leaves (figure 2). Peeling away the outer tissues of the main stem may reveal a blackened or discolored area in the cambium. Depending on the extent of the infection, plants may appear stunted with some dieback or the majority of the above-ground parts may be dead with few green leaves. On infected plants, root tissues are damaged and plants may have root systems  $\frac{1}{3}$  less than the volume of healthy plants of a similar size and age. The roots may appear soft, rotten, or darkened, often with sloughing cortex tissue.

In Europe and China, *P. tentaculata* causes crown, stem, or root rot on woody and herbaceous plants in both nurseries and commercial fields.



Figure 1. Various degrees of *Phytophthora tentaculata* damage on roots and stems of sticky monkey flower that had been outplanted at a restoration site.

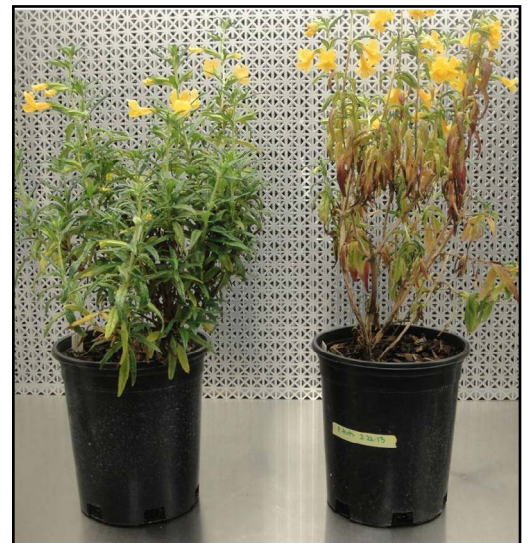


Figure 2. Sticky monkey flower plants. Left: healthy. Right: Inoculated with *Phytophthora tentaculata*.

## Hosts

In California nurseries and outplanted container stock, the pathogen has been detected on native woody plant species including toyon (*Heteromeles arbutifolia*) [Rosaceae] and coffeeberry (*Frangula californica* [Rhamnaceae]) as well as suffrutescent perennials such as sticky monkey flower (*Diplacus aurantiacus* subsp. *aurantiacus* [Scrophulariaceae], figure 3) and sage (*Salvia* spp. [Lamiaceae]).

In Europe and China, known susceptible species include: *Apium* (Apiaceae), *Aucklandia* (Asteraceae), *Chicorium* (Asteraceae), *Chrysanthemum* (Asteraceae), *Delphinium* (Ranunculaceae), *Gerbera* (Asteraceae), *Lavandula* (Lamiaceae), *Santolina* (Asteraceae), *Origanum* (Lamiaceae), and *Verbena* (Verbenaceae).

## Distribution

In California, the pathogen has been detected in five native plant nurseries (Butte, Monterey, Placer, Santa Cruz Counties) and three habitat restoration sites in Monterey and Alameda Counties. The pathogen has also been found in nurseries and commercial fields in China and Europe.

## Spread

*Phytophthora tentaculata* has likely been spread by the movement of infected plants into new locations or the planting of healthy plants in previously contaminated pots or potting mix.

## Concern

Restoration nurseries provide planting stock for forest and other environmental settings, so any associated pathogens can be moved into new locations and cause lasting environmental damage. The inadvertent outplanting of infected rare plant species poses an especially serious risk to remaining wild populations with limited habitat areas, which may become permanently infested.

## Reporting and further information

*Phytophthora tentaculata* is considered an “actionable and reportable” pest by the USDA Animal and Plant Health Inspection Service (APHIS). If it is detected, reporting to USDA APHIS is required.

Confirmation of *P. tentaculata* requires laboratory diagnosis. To report symptomatic plants or to receive additional information, please contact your County Agricultural Department, UC Cooperative Extension, or State and Federal forest health specialists.



Figure 3. *Phytophthora tentaculata* symptoms on outplanted sticky monkey flower.

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Photographs:

Figure 1: Suzanne Rooney-Latham, California Department of Food and Agriculture.

Figure 2: Suzanne Rooney-Latham, California Department of Food and Agriculture.

Figure 3: Ted Swiecki, Phytosphere Research.