A Serious and Potentially New Aphid Pest in the Genus *Cinara* (Sternorrhyncha: Aphididae) Attacking *Cupressus sempervirens* in Coastal Southern California

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Abstract

Co-author Paul Santos recently detected a serious and potentially new aphid pest of *Cupressus sempervirens* (Italian cypress) in coastal regions of southern California in May and July, 2025. The aphid is in the genus *Cinara*, the conifer aphids, but identification to species is difficult based on morphological characters only; molecular data are necessary to resolve a species level identification. We provide an overview of *Cinara* aphids and in particular the *C. cupressi* species complex to which the new pest likely belongs and discuss and illustrate this potentially new *Cinara* aphid pest, the host plant *Cupressus sempervirens*, damage symptoms, and possible management strategies.

Introduction

Co-author Paul Santos recently detected a serious, damaging and what appears to be a new pest of *Cupressus sempervirens* (Italian cypress) in coastal regions of southern California (**Figs. 1–2**). On May 30, 2025, Ken Kelly of Finley's Tree and Landscape, Inc., brought leaf, twig, and branch samples from *C. sempervirens* in coastal Orange County to Santos, who found copious sooty mold and cast-off exoskeletons but no live aphids. A little over a month later, on July 10, 2025, Ken Rokosz of RPW Services, Inc., brought samples of *C. sempervirens* with live aphids from Irvine, California to Santos, who identified the aphids to the genus *Cinara*. Santos forwarded the sample to the California Department of Food and Agriculture Plant Diagnostics Center in Sacramento, which confirmed the genus *Cinara* but was unable to identify a species because aphids in this genus are unusually similar morphologically and molecular data (DNA) are necessary for resolution and proper identification.

Here we discuss and illustrate the aphid pest *Cinara*, the host plant *Cupressus sempervirens*, damage symptoms, and possible management strategies.

1. The newly discovered aphid can cause serious and extensive damage to the iconic Italian cypress in coastal southern California, as here in Seal Beach.

2. In Seal Beach, the newly discovered aphid causes caused serious damage and even death of these Italian cypress trees.

Cinara

Cinara, commonly referred to as conifer aphids or giant conifer aphids, is a genus of about 250 species of large, variously dark-colored and -marked aphids that attack conifers in the pine (Pinaceae) and cypress (Cupressaceae) families (Jousselin et al (2013). Curtis (1935) established the genus, named for the Greek island Kinaros in the Aegean sea, and which itself is derived from the Greek word for artichoke, *kinara* (Wiki 2025). About 154 species of Cinara are recorded for North America (Favret 2025), 47 in Europe and the Mediterranean (Couer d'acier et al. 2010, Nieto 2007), and 40 in Asia (Wiki 2025).

Cinara aphids can be serious pests of their coniferous hosts and many outbreaks have occurred over the last 45 years that have caused significant damage and, in some cases, losses of ornamental landscape and shade trees and especially trees in plantations and reforestation efforts in southern and western Europe (Inserra et al. 1979), Jordan (Mustafa 1987), Colombia, Mauritius, and Malawi (Mills 1989). CABI (2019) lists over 25 countries in Europe, the Middle East, Oceania, and South America where *Cinara* aphids have caused significant damage and losses over the last 50 years.

We suspect that the potentially new aphid pest of *Cupressus sempervirens* is *Cinara cupressi* or an unidentified species new to science; whichever it is, it is likely in the *C. cupressi* species complex (a group of species so similar and closely related that they are nearly impossible to separate satisfactorily) and requires molecular data to confirm its identity. This species complex could also be referred to as *C. cupressi sensu lato* (the latter from the Latin meaning in the broad sense).

Cinara cupressi Species Complex

Taxonomy and Nomenclature

The taxonomy and nomenclature of the *Cinara cupressi* species complex is in flux and somewhat controversial (Remaudière and Binazzi 2003) and comprises several morphologically similar species (Watson et al. 1999). Three taxa in the species complex appear to have originated in North America: *Cinara sabinae* on *Juniperus sabina* from Arizona; *Cinara canadensis* on *Juniperus virginiana* from Ontario, Canada; and *Cinara cupressi* on various Cupressaceae, perhaps from California but originally named and described from the United Kingdom (Watson et al. 1999). Previously, Eastop(1972) had synonymized several species with *Cinara cupressi*.

Watson et al. (1999) conducted a multivariate morphological analysis of the *Cinara cupressi* species complex using aphid specimens collected from around the world. They concluded t that some of the component taxa within the species complex might be distinct species but were not

satisfactorily distinguishable solely on morphological characters. Nonetheless, they named and described a new species, *Cinara cupressivora*, based on morphological and biological differences, especially host plant preferences. This new species is from eastern Greece and the southern Caspian Sea region, and Remaudière and Binazzi (2003) synonymized it with *C. cupressi*.

The various component species of the *Cinara cupressi* species complex might prove to be separate species but they cannot be consistently and reliably distinguished by morphological characters alone. Molecular data will be required for final identification.

Description

Aphids in the *Cinara cupressi* species complex are relatively large, brownish gray, and covered with long, slender hairs on the conical siphunculi (structures on the sixth abdominal segment that emit pheromones (CABI 2019).

They differ from other species of *Cinara* in the second segment of the hind tarsus (final segment of the leg) being shorter than its basal width; numerous hairs on its subgenital plate (plate-like appendage of the ninth abdominal segment in males and the seventh in females and part of their external genitalia; primary rhinaria (chemo-sensory structures on antennae) lacking a sclerotized rim; and only three hairs present on the tip of the processus terminalis (slender, whip-like apical part of the final antennal segment) (CABI 2019), indicting they are in subgenus *Cupressobium* (Blackman and Eastop 1994, Eastop 1972),

Taxa in the *Cinara cupressi* species complex differ from other species in subgenus *Cupressobium* by lacking or having little pigment in their middle hind tibia and the presence of four to eight setae on the basal half of antennal segment VI (Watson et al. 1999).

Adults of the recently discovered, potentially new aphid are grayish with two longitudinal black bands along the back starting at the head and extending to about half-way where they end with several transverse, black bands, the ultimate of which terminates the back and is wide and extends from one side to the other, or sometimes this area is mottled gray and black. Lateral margins have black spots and the distal portion of its legs is black (**Figs. 3–4**).

Distribution

The origins of the aphids in the *Cinara cupressi* species complex are as follows: *C. sabinae* is from Arizona, Colorado, and Utah; *C. canadensis* is from Ontario, Canada and Pennsylvania; *C. cupressi* is from California and the United Kingdom; and *C. cupressivora* is from North America, Greece, Iran, and Syria (CABI 2019, Watson et al. 1999). However, taxa of this species complex are now widely distributed across North America, Europe, Africa, South America, Middle East, Asia, and Oceania where they can cause considerable damage (CABI 2019, Watson et al. 1999).

3. Adult of the newly discovered aphids are grayish with two longitudinal black bands along the back starting at the head and another black band along each lateral margin. Note the black distal portion of the legs. © 2025 P. Santos.

4. On their back, adults of the newly discovered aphid have two black bands running from the head toward the posterior and there they have transverse black bands. They also have black spots along each lateral side. © 2025 P. Santos.

Dispersal and Movement

Aphids in the *Cinara cupressi* species complex disperse naturally through flight of winged forms, which are produced several times a year in response to overcrowding and environmental clues (Kairo and Murphy 1999). They are strong fliers easily aided and propelled by wind (CABI 2019).

They are also easily transported on plant material where, because of their dark color and preference for shady and dark areas inside the plant canopy, they are often overlooked and escape detection (Ciesla 1991, Remaudière and Binazzi 2003).

Host Species

Aphids in the *Cinara cupressi* species complex tend to have different host preferences although *C. cupressi* is more polyphagous and has been recorded on *Thuja occidentalis* and *T. plicata* and several other species in the Cupressaceae (CABI 2019). Some potential host species in southern California include ×*Cupressocyparis leylandii* (formerly *Cupressus leylandii*) (Leyland cypress), *Cupressus sempervirens* (Italian cypress), *Hesperocyparis arizonica* (formerly *Cupressus arizonica*) (Arizona cypress), *H. macrocarpa* (formerly *Cupressus macrocarpa*) (Monterey cypress), *Juniperus scopulorum* (Rocky Mountain juniper), and *Platycladus orientalis* (formerly *Thuja orientalis*) (oriental arborvitae).

So far, the recently discovered, potentially new aphid pest in the *Cinara cupressi* species complex seems restricted to *Cupressus sempervirens*. It has not yet been detected on other potential host species.

Biology and Ecology

Aphids in the *Cinara cupressi* species complex can reproduce asexually year-round through parthenogenesis with up to 12 generations recorded for Italy (Binazzi 1997) and 10 for Jordan (Ciesla 1991) annually under optimal environmental and host conditions.

Mustafa (1987) studied the biology of *Cinara cupressi* and found that under constant conditions of 20+/-1 degree C and 30% RH, the fecundity, pre-reproduction period, reproduction period and lifespan for its apterous morph was 23.5 nymphs/female, 15.3 days, 5.3 days and 21.9 days, respectively. The seasonal cycle of *C. cupressi* was studied under field conditions in Jordan for two successive years. High numbers of the aphids were found between early January and late May, but none or very few from June to December.

These aphids avoid strong light, and dense colonies develop in shade, with up to 80 aphids per 10 cm of trig, small branch, or bark (CABI 209). Their preference for shady conditions suggests that they will tend to colonize and congregate in interior sections of the plant's canopy, not on the exterior although damage will show in these more well-lit, exposed areas.

The natural dark color and markings of these aphids are excellent camouflage against the host species' twigs, small branches, and bark (Ciesla 1991).

Most species of *Cinara* feed on a single or few coniferous host species while others are more generalists, feeding on several species within a genus or even different genera (Jousselin et al. 2013). Some *Cinara* species have specific host feeing sites, for example on young shoots or on trunks (Wiki 2025).

Our few, anecdotal observations of this recently discovered, potentially new aphid pest in the *Cinara cupressi* species complex suggest that it might prefer cooler, more humid coastal areas of southern California rather than warmer, more arid inland regions. We have observed aphid activity and damage in coastal areas but little or none in inland areas. Also, Mustafa (1987) noted that aphid populations were highest from January to late May, which typically corresponds to cooler, more humid and sometimes rainy conditions in southern California.

Natural Enemies

The best documented natural enemy of aphids in the *Cinara cupressi* complex is the hymentopteran endoparasitoid *Pauesia juniporum*, which is not so host-specific but has been employed for biological control in Malawi, Africa. Another, similar but unidentified wasp was found in Syria and is more host-specific and provided more effective biological control than *P. juniporum* (CABI 2019). Anecdotally, we have observed a fair amount of lady beetle and green lace wing activity on aphid-infested Italian cypress.

The Host: *Cupressus sempervirens*

Cupressus sempervirens (the specific epithet is of Latin origin meaning evergreen) is a moderate to large, unarmed, monoecious, evergreen, coniferous tree (**Figs. 5–11**) thought to be indigenous to the eastern Mediterranean region but is now widely cultivated in warm temperate and subtropical regions in Europe, Middle East, Asia, Africa, Oceania, and North and South America (Farjon 2017). It is much revered and has been long cultivated since Roman times in ancient Mediterranean civilizations (CABI 2019).

History and Taxonomy

The Swedish biologist and physician, Carl Linnaeus (known as Carl von Linné after his ennoblement in 1761), 23 May 2007, Råshult, Sweden to 10 January 1778, Uppsala, Sweden, who is considered the father of modern biological taxonomy because he championed and formalized the binomial system of naming living things, officially named and described *Cupressus sempervirens* in his opus *Species Plantarum* in 1753 (Linnaeus 1753), noting it was from Crete. In doing so, Linnaeus cited several previous accounts, including the account of this species in his

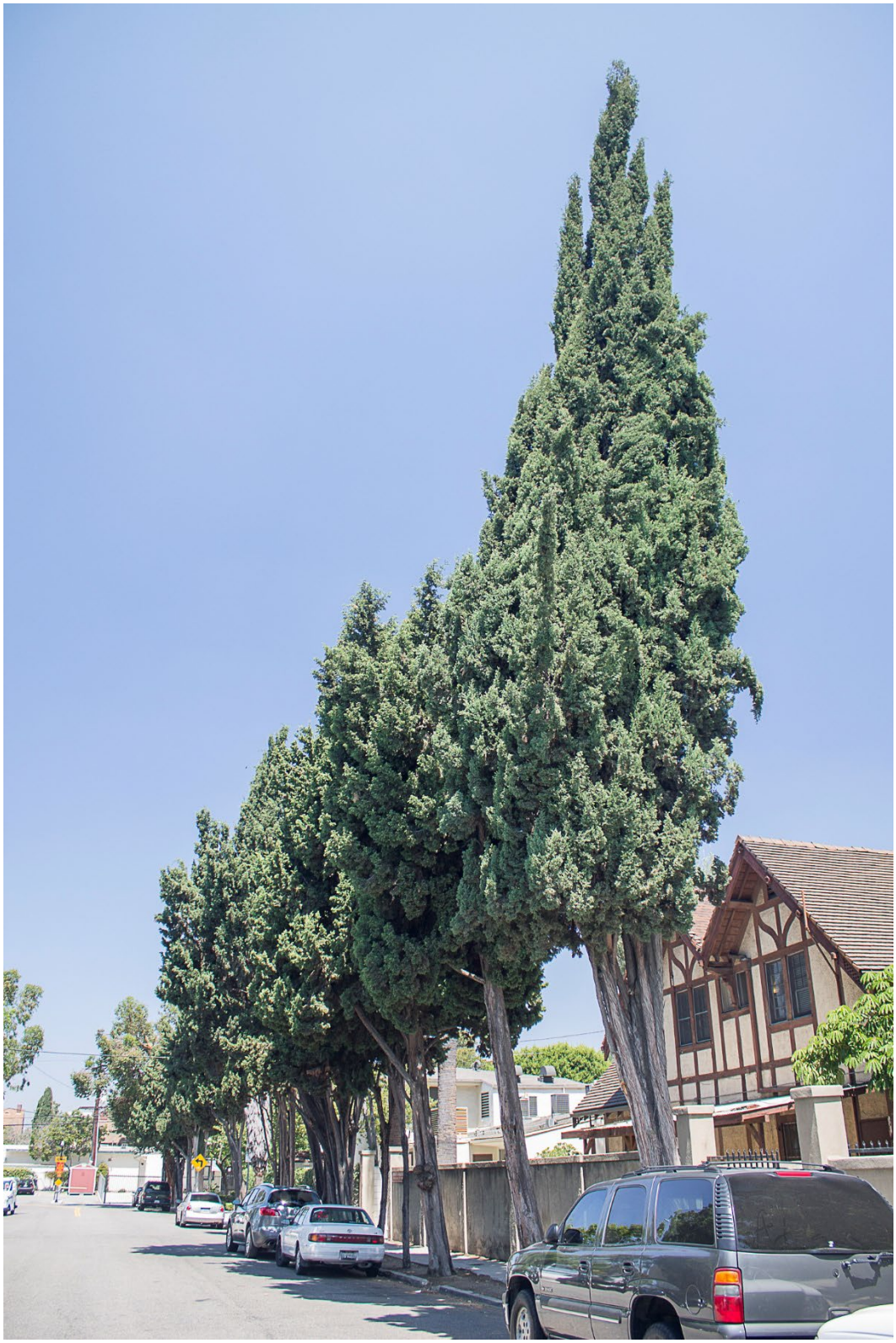
5. These Italian cypress in Fullerton, California are best known for their iconic, fastigiate form, the much more common form in the landscape.

6. This planting of the fastigiate form of Italian cypress lines the side of the historic Simon Murphy house in Whittier, California, which dates to 1887.

7. The 200 block of W. Whiting Avenue in Fullerton, California is lined with mostly the much less common, horizontal form of the Italian cypress.

8. This horizontal form of the Italian cypress is in the 200 block of W. Whiting Avenue in Fullerton, California.

9. This imposing specimen of the horizontal form of the Italian cypress is in the 200 block of W. Whiting Avenue in Fullerton, California.



10. The iconic and much more common fastigiate form of the Italian cypress lines a street on the campus of the University of Southern California in Los Angeles.

11. Arborist Ken Greby provides scale for this fastigiate form of the Italian cypress on the campus of California State Polytechnic University in Pomona.

Hortus Cliffortianus (Linnaeus 1737), a collaboration of Linnaeus and illustrator George Dionysius Ehret and financed by George Clifford, a wealthy Amsterdam banker and a keen botanist with an unusually large herbarium. Silba (1983) lectotypified *C. sempervirens*, selecting a Clifford specimen at the British Museum.

A tree of many purposes, *Cupressus sempervirens* is used for plantations and reforestation efforts under unfavorable conditions, including shallow, dry rocky, and/or clay soils; produces high-quality and durable wood but with low yields; makes an adequate windbreak for soil conservation and forest protection (CABI 2019); and is a superb ornamental landscape tree tolerant of a variety of adverse environmental conditions, including heat, cold, wind, aridity, poor soils, and to a great extent drought although is does best with several timely irrigations in our rainless summer.

Two growth forms comprise *Cupressus sempervirens*: horizontal (more of a typical free-form tree shape to broadly conical) (**Figs. 7–9**) and fastigiate (naturally narrowly upright with compact, dense branching typically forming a narrow or columnar growth form, which pruning can enhance and maintain) (**Figs. 1–2, 5–6, 10–11)**. Both forms have taxonomic rank. The horizontal form predates humans and is the only form on Crete, the location Linnaeus (1753) noted when he named it (CABI 2019); thus, this form is the "typical" form of the species although MO (2025) disagrees and has the fastigiate form as the "typical" form of the species. The 200 block of Whiting Avenue in Fullerton, California is lined with one of the largest plantings of the horizontal form of the Italian cypress in southern California. The fastigiate form is of horticultural origin, likely developed and maintained through selection, breeding, and asexual propagation, and dates to early historic and prehistoric times. Many named fastigiate forms exist and these are best referred to as a cultivars. They often do not come true from seeds and horizon individuals can arise for fastigiate forms (Farjon 2005). The more formal-appearing, ornamental fastigiate form is the one nearly always encountered in southern California landscapes; the horizontal form is rarely seen.

Description

Cupressus sempervirens grows to 30 m tall with a trunk 50 to 60 cm DSH. The horizontal form, the one found in the wild, has spreading branches and a broadly ovoid or conical shape. The fastigiate form, the more common one in cultivation, has densely compact, erect and ascending branches and a narrow columnar shape. The bole is straight, the bark gray, thin, fibrous with fine longitudinal ridges (CABI 2019) (**Figs. 12–13**).

Leaves are small, scale-like, imbricate, tightly appressed, decussate (successive pairs of leaves are 90° apart) (**Fig. 14**), with large, more or less visible resin ducts in the dorsal part (CABI 2019).

12. The trunk and bole of Italian cypress are typically straight, as here in the 200 block of W. Whiting Avenue in Fullerton, California.

13. The bark of the Italian cypress is typically gray, thin, fibrous with fine longitudinal ridges.

14. Leaves of the Italian cypress are small, scale-like, imbricate, tightly appressed, decussate. The swelling of some of the branchlet tips is like the developing staminate inflorescences, which will open and release pollen in the winter.

15. Pistillate cones of the Italian cypress are about 2.5 cm in diameter at the end of their second year are nearly ready to open and release their seeds.

16. Pistillate cones of the Italian cypress are scattered across the tree's canopy s solitary individuals or small groups.

Staminate or male inflorescences or cones (microsporophylls) are three to five mm long and two mm wide. They appear at branchlet tips in winter in the lower part of the canopy (**Fig. 14**). They liberate their wind-blown pollen from January through March in southern California (CABI 2019).

Pistillate or female inflorescences or cones (macrosporophylls), scattered across the canopy as solitary individuals or small groups, are initially 2.5 mm in diameter, subglobose, with 6 to 12 scales, each bearing 6 to 20 ovules, in the upper canopy. By June, fertilized macrosporophylls are one cm in diameter and green. By November, mature macrosporophylls are 2.5 cm long, two cm wide, initially pale yellow then turn silver-gray, and their scale open slightly (**Figs. 15–16**). By fall or winter of the second year, the scales open more and seeds are liberated (CABI 2019).

Distribution

Cupressus sempervirens is indigenous to the eastern Mediterranean. However, because it has a long history of cultivation, its more precise distribution is contentious. Some authors feel its original natural range is eastern Greece and around the southern Caspian Sea (Watson et al. 1999) while others have a more expansive view, including Cypress, Syria, Israel, Turkey, and Lebanon (Ducrey et al. 1999).

Whatever its origin, *Cupressus sempervirens* is widely cultivated in warm temperate and subtropical regions around the world, including Africa, Asia, Middle East, Europe, North America, South America, and Oceania (CABI 2019).

Indeed, it has naturalized in Greece, Italy, France, Portugal, and Spain. It is closed associated with the Tuscany region of Italy and the Val du Rhône in France (CABI 2019). It is considered invasive in Chile (Juan Fernendez Islands) and Cuba (Belov 2009, Oviedo Prieto et al. 2012). PIER (2025) gave it a high invasive risk assessment for Pacific Islands.

Habitat

Across its range, *Cupressus sempervirens* occurs naturally in woodlands, interior valleys, and coastal mountains from 500 to 2000 m elevation in areas with a Mediterranean climate, meaning cool, moist winters and warm to hot, arid, mostly dry summers (Belov 2009, Farjon 2013). It is often found in disturbed areas like roadsides, gardens, and parks (Farjon 2013). Associated trees include *Juniperus* spp., *Pinus* spp., *Pistacia* spp., and *Quercus* spp. (Farjon 2013).

Environmental Conditions

Cupressus sempervirens grows best in full sun situations in well drained, sandy, loam, or clay, and slightly acid to alkaline soils. Drainage seems to be critical. It grows poorly in shade and on excessively moist or wet soils rich in organic matter (CABI 2019).

Although a minimum of 1000 mm of rain annually provides best growth, trees can tolerate less, as little as 600 mm or slightly less annually, or even several months of drought but tree performance will suffer in severely dry summers (Ducrey at al. 1999). Thus, occasional summer irrigation might be especially beneficial.

Minimal summer and mean annual temperatures for optimal growth are 15 to 20 C (CABI 2019). Trees can tolerate winter temperatures as low as ¯20 C (Puric 1967) and can survive being covered with snow for several months (Belov 2009, Farjon 2005).

Symptoms

Generally, aphids in the *Cinara cupressi* species complex feed on young green twigs and small branches, bark, and even trunks (CABI 2019). Initial infestations occur in the inner and lower canopy of the host, where the aphids feed on bark of twigs and small branches, leading to dieback in the outer canopy (Ciesla 1991). On tall narrow, fastigiate forms of *Cupressus sempervirens*, infestations begin on the outer edges of the lower canopy and move upwards (Inserra et al. 1979) (**Figs. 17–18**). Eventually, an entire tree can be infested and turn brown (**Figs. 2, 19**).

We have observed this pattern with the newly discovered aphid pest in the *Cinara cupressi* species complex. Because they are sapsucking pests, these aphids tend to produce copious amounts of sugary honeydew, which coats nearby surfaces of twigs, small branches, the trunk, and leaves (**Figs. 20–21**), leading to unsightly sooty mold and turning everything conspicuously black (CABI 2019) (**Figs. 22–24**). Eventually, leaves turn brown and dieback occurs (**Figs. 25–26**). The black sooty mold and brown dieback occur in randomly distributed patches on the canopy that tend to enlarge and coalesce over time. Whether mechanical or a hypersensitive reaction to chemical compounds in the aphids' saliva cause the damage is unclear (Inserra et al. 1979).

A common disease of *Cupressus*, including *C. sempervirens*, is cypress canker, which is caused by the fungus *Coryneum* (*Seiridium*) *cardinale*. This disease also causes splotchy dieback here and there in the canopy and could be confused with aphid damage; however, it can be distinguished from aphid damage by resinous lesions in infected bark and cambium that girdle branches and twigs, causing yellowing and dieback (UC IPM 2025).

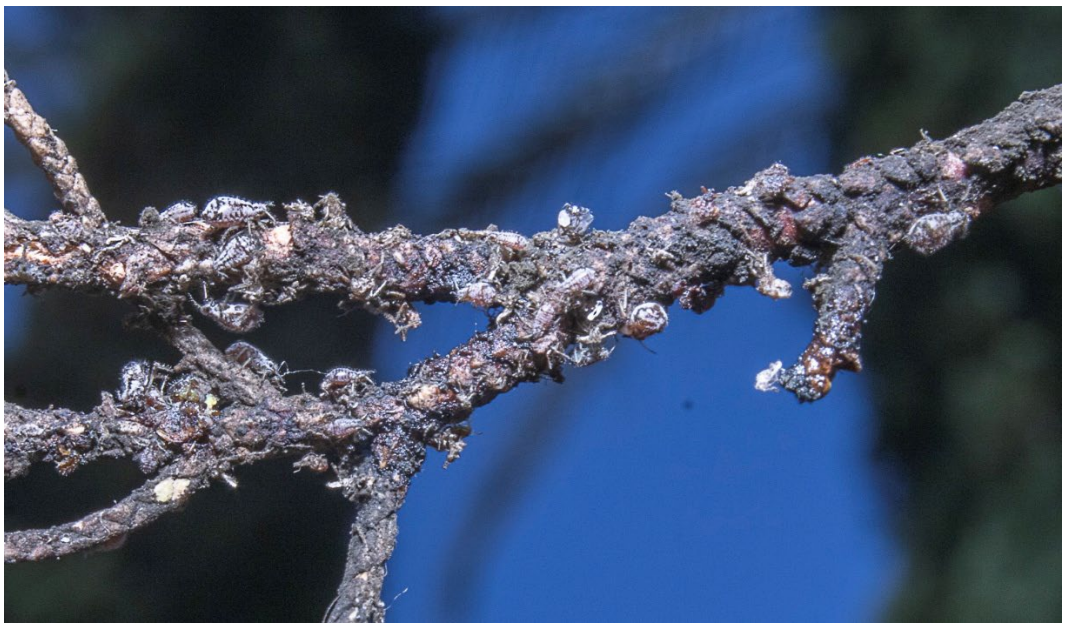
Management

Successful integrated pest management starts with optimal cultivation. Select the right species for the right place in the landscape, plant and care for it properly, paying close attention to water, mulch, nutrition, and pruning.

17. Co-author Paul Santos surveys initial damage from the newly discovered aphid at the base of an Italian cypress in Irvine, California.

18. Infestations of the newly discovered aphid on this Italian cypress in Irvine, California are working their way up the tree.

19. Eventually, infestations of the newly discovered aphid reach the top of this Italian cypress in Seal Beach, and now it is nearly dead.



20. The newly discovered aphid tends to produce copious amounts of sugary honeydew, which coats nearby surfaces of twigs, small branches, the trunk, and leaves of this Italian cypress tree in Irvine, California.

21. The newly discovered aphid are congregating of this twig, producing copious amounts of sugary honeydew, which coats nearby surfaces of twigs, small branches, the trunk, and leaves of this Italian cypress tree in Irvine, California.

22. The base of this Italian cypress tree in Irvine, California is heavily infested with the newly discovered aphid, which secretes honeydew that leads to unsightly, black sooty mold.

23. The newly discovered aphid on Italian cypress trees produces copious honeydew, which coats all surfaces and leads to unsightly, black sooty mold.

24. The newly discovered aphid on Italian cypress trees produces copious honeydew, which coats all surfaces and leads to unsightly, black sooty mold.

25. This row of Italian cypress trees in Seal Beach, California was healthy and uninfested with the aphid in 2020. Compare it to the same row of trees five years later in Figure 26.

26. In 2025, the same row of Italian cypress trees in Seal Beach, California in Figure 25 are now heavily infested two years later.

Host Resistance

Different species of Cupressaceae vary in their resistance to aphid pests in the *Cinara cupressi* species complex. Obiri (1994) reported a wide range of tolerance among host Cupressaceae species in Kenya. *Thuja* and ×*Cupressocyparis leylandii* were most tolerant of aphid damage while *Widdringtonia* and *Callistris* were least tolerant. In *Cupressus* and *Hesperocyparis*, *C. torulosa*, *C. funebris* , and *Hesperocyparis arizonica* were most tolerant of aphid damage while *Hesperocyparis benthamii*, *H. lusitanica*, and *H. lindleyi* were least tolerant.

Hybrids of more tolerant species show promise as a long-term solution (Orondo and Day 1994; Kamunya et al. 1997, 1999; Mugasha et al. 1997).

Biocontrol

The parasitoid of aphids in the *Cinara cupressi* species complex, *Pauesia juniperorum*, has reduced aphid damage in Malawi (Chilima 1995) and Kenya and Uganda (Day et al. 2003). Naturally occurring predators like lady beetles and green lace wings may also help suppress pest populations and they should be encouraged.

Chemical Control

Because of their soft bodies, aphids are relatively easy to control with insecticides as a last option. However, because the potentially new aphids are typically hidden in dark, shady areas inside the host canopy, applying contact materials can provide less-than-optimal control. Sprays must be thorough and penetrate the canopy to be effective. As an alternative or in conjunction with sprays, soil-applied systemics can be effective. Imidacloprid, dinotefuran, acephate, flupyradifurone, and azadirachtin have all provided effective control of the potentially new aphids.

Controlling ants with poisoned baits, which “farm” aphids, moving them around and protecting them from predators, is considered essential for adequate aphid management.

Because the potentially new aphids are most active in cooler, moist weather, which is typically late November through March in coastal southern California, late October and early November are good times to develop and implement a management plan.

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