SOUTH AMERICAN PALM WEEVIL

A DEVASTAVING THREAT TO PALM TREES IN CALIFORNIA

SAPW in larvae stage

Infested palm being removed in San Diego

INTRODUCTION

South American palm weevil (SAPW) (Rhynchophorus palmarum) was first detected by trapping in San Ysidro in May 2011. Since then, this weevil has heavily infested the Bonita and Chula Vista areas of South San Diego and has been found in traps as far North as San Marcos.

This invasive pest is a serious threat to many native and non-native palm species. The favorite Canary Islands Date Palm (*Phoenix cararіensis*) and edible date palms (*Phoenix dactylifera*) are the most at risk of damage, potentionally devastating the $140 million date and ornamental nursery industry in southern California.

LIFE CYCLE

The adult South American palm weevil emerges out of its cocoon approximately 1 ½" long, all black in color, with small hairs on its body. It begins its adult life (30-60 days) finding a mate and flying to nearby palm trees to eat and lay eggs. The eggs are laid at the top of the palm tree's crown.

The SAPW eggs are pearly white in color and oval in shape. The eggs are 2.5mm long and about 0.87mm wide when freshly laid inside the flesh of the palm.

The larvae range from 1-5" long while boring into the stem of the palm to feed on decaying and live tissues. The SAPW larvae have an orange head and white abdomen. The larvae continue to feed and grow larger until pupation. The larval period ranges from 36-78 days.

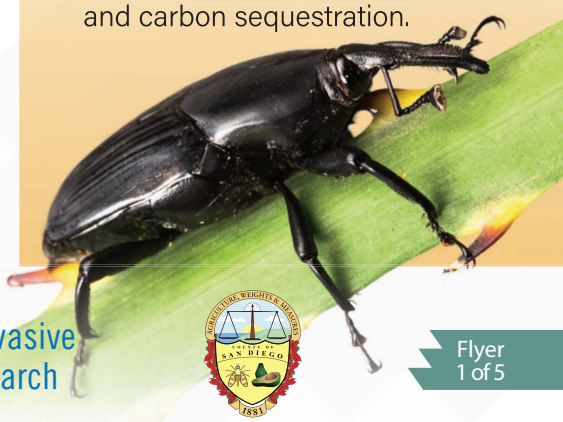
The pupal stage lasts 14-21 days. The cocoon is made out of fibrous vascular bundles of palm. The cocoons are about 7.2cm long and 3.0 cm wide.

IMPACT

South American palm weevils are attacking palm tree species found throughout Southern California on private properties, municipal, county, state, federal public lands, and tribal lands. This species can infest healthy, undamaged palms, feeding on the growing crown tissue and ultimately killing the tree. Females may oviposit between 120-150 eggs in a 30 day span. A healthy adult coconut palm can be killed by only 30 larva.

TREE DECLINE AND DEATH CAN RESULT IN:

- Public safety hazards due to falling limbs, fire danger, and flood risk due to water way blockages.
- Decreased property value.
- Increase air and noise pollution.
- Habitat loss for birds and other wildlife.
- Loss of ecosystem services, including cooling, water filtration, and carbon sequestration.



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Adult Palm Weevil

Tree removal due to infestation.

CONTROL

The spread of this pest can be delayed with the fast detection and removal of infested trees. Chipping, burning, and burying infested material deeply can reduce the likelihood that SAPW will emerge and escape from infested palms. Keeping the palms healthy, reducing pruning activity, and the use of systematic insecticide application may prevent infestations of the SAPW. However, research is still ongoing for the most effective control method.

SYMPTOMS

Yellowing Foliage

Flattening of Crown

Frond Boring Damage

Pupal cases near tree trunk base

Notching on newly emerging fronds

POTENTIAL HOSTS

- **Coconut** (*Cocos nucifera*)
- **African Oil Palm** (*Elaeis guineenis*)
- **Açai Palm** (*Euterpe oleracea*)
- **Sago Palm** (*Meteroxylon sagu*)
- **Canary Islands Date Palm** (*Phoenix canariensis*)
- **Date Palm** (*Phoenix dactylifera*)
- **Fan Palms** (*Washingtonia spp.*)
- **Kings/Queens/Royals** (*Archontophoenix/Syagrus/Roystonea spp.*)

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SOUTH AMERICAN PALM WEEVIL

COMMON PALM PROBLEMS & PEST IDENTIFICATION

The progression of palm tree decline once infested with SAPW

INTRODUCTION

There are many pests and diseases plaguing palm trees in Southern California. The key to proper management and mitigation starts with correctly identifying what problem your palm tree might be having. South American palm weevil (SAPW) is one huge threat to native and non-native palms alike. Due to its large size and fast reproduction, it is important to correctly identify if SAPW is the cause of your palm tree decline.

IDENTIFYING FACTORS OF SAPW

These are the signs to look for when trying to determining if South American palm weevil is causing your tree decline.

- Accumulated frass (insect excrement) at leaf bases.
- Pupal cases on the ground near the tree.
- Holes and tunneling at the base of palm fronds.
- Characteristic putrid odor.
- Progressive foliage yellowing and eventual death.
- Begins in the topmost newest leaves and progressively goes down into the crown.

Pupal Cases

Tunneling Holes

Rotting Putrid Odor

Frass

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OTHER PROBLEMS

Although South American Palm Weevil is a huge threat and could potentially be the reason for palm tree decline, there are other pests and diseases that can cause significant damage or even death to a palm tree.

FUSARIUM WILT *(Fusarium oxysporum f. sp. canariensis):*

- Fungal infection that damages lower leaves that die from the bottom up
- Characteristically showing symptoms in only half of the palm tree.

RED PALM WEEVIL

(Rhynchophorus ferrugineus and R. vulneratus):

- Attacks Canary Island date palms.
- Can be identified by red stripes on adults.
- Eradicated from California (2015).

DIAMOND SCALE

(Phaeochoropsis neowashingtoniae):

- A fungal infection that causes dark, water-soaked spots that expand from pinprick size to shiny black diamond-shaped fruiting bodies on leaves and stems.
- Large amounts of spores can cause tree decline from the bottom up.

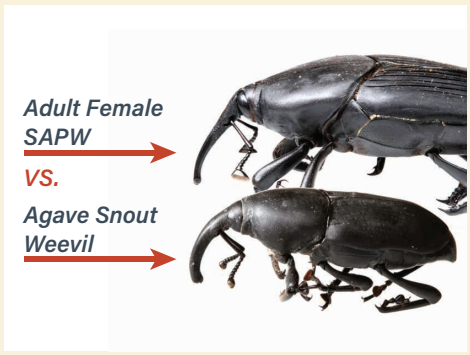
GIANT PALM BORER

(Dinapate wrightii):

- This beetle tunnels into palm wood, leaving large holes about ½ inch in diameter.
- Adults have rounded heads with no "weevil snout."
- A secondary pest, attacking already weakened plants.

OTHER PESTS

- Rats, agave snout weevil, armored scale insects, aphids, mealybugs, mites, moths and caterpillars.
- Distinguish between SAPW and other insects by the presence of pupal cases and galleries, topmost crown leaves die first (other insect pests damage leaves without causing full-scale dieback).



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WHAT TO DO IF YOU FIND SOUTH AMERICAN PALM WEEVILS

Adult South American Palm Weevil

Canary Islands Date Palm

BACKGROUND:

South American palm weevil (SAPW) (*Rhynchophorus palmarum*) inflicts physical damage on palms through boring galleries, causing frond death, weakening palm immune systems to other diseases, and leading to the eventual death of the whole tree.

It was first detected by trapping in San Ysidro in May 2011, and the weevil has heavily infesting the Bonita and Chula Vista areas of South San Diego. It has since spread, found in traps as far North as San Marcos, and is a serious threat to many palm species.

MONITOR FOR PALM WEEVIL:

The goal of SAPW monitoring is to evaluate the spread of the weevil, learn which geographic areas are at risk, and take prophylactic action to protect palms.

VISUAL INSPECTION

Visually inspect your tree(s) at regular intervals for signs and symptoms of palm weevil:

- **Crown Symptoms:** burrowing larva and roaming adults, putrid smell, damaged newly emerging fronds, frass
- **Frond Symptoms:** holes, notched leaves, yellowing, crown drooping
- **Trunk Symptoms:** holes near heart, and other physical damage, weevil excrement, pupal cases near base of trunk.

TRAPPING

The most common trapping method is a home-made 1 to 5 gallon bucket trap or a commercial Picusan trap. ***There are three attractants needed:***

1. An aggregation pheromone
2. Ethyl acetate
3. Food baits: sugarcane, pineapple, apple, chopped dates.

Bucket traps can be placed on the ground or suspended from a pole or tree at least 150 meters away from the palms you wish to monitor. Lures should be replaced every six weeks.

Visual Inspection

Bucket Trapping

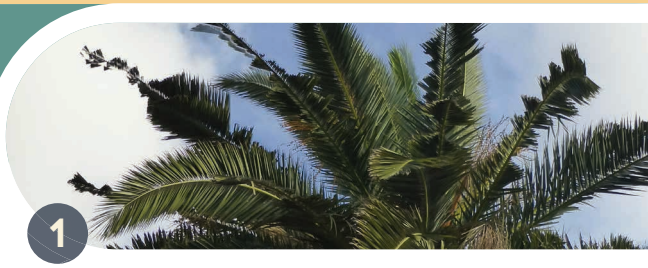
MITIGATE THE SPREAD OF SAPW

- Fast detection, treatment, and removal is key: report infestations and make plans to treat or remove infested palms.
- Infestations in damaged or dead palms can be controlled physically (with removal and destruction) or chemically (with pesticides).
- Remove dead or dying trees that cannot be treated as they will continue to host weevil populations and can infect trees nearby.
- Palm removal can be expensive, potentially dangerous, and should be undertaken only by professional arborists.
- Chipping, burning, and burying remnants destroys larvae, pupae, and adults.

IDENTIFY SOUTH AMERICAN PALM WEEVIL:

Look for these 4 signs to identify South American Palm Weevil in your palms or on public property:

1. New frond leaf notching
2. Yellowing leaves, crown decline
3. Debris/pupal cases under the tree
4. Fronds flattening top down



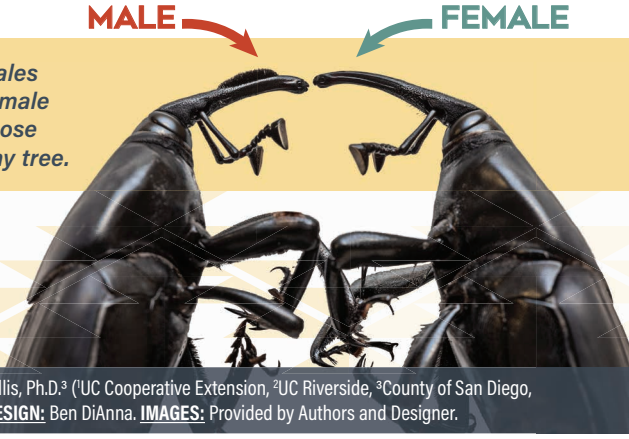
HOW TO REPORT SAPW

Report infestations or symptomatic palm trees on your property or anywhere you find them.

- Visit ***cisr.ucr.edu/palmarum_survey.html*** and *"Click Here to Report Infested Palms"*
- Contact County Department of Agriculture, Weights & Measures Insect/Bee Hotline at ***1-800-200-2337***

TIP!

Identify the ratio of males to females by looking for the "comb" on the male rostrum (nose). Mated females pose the most risk to overtake a healthy tree.



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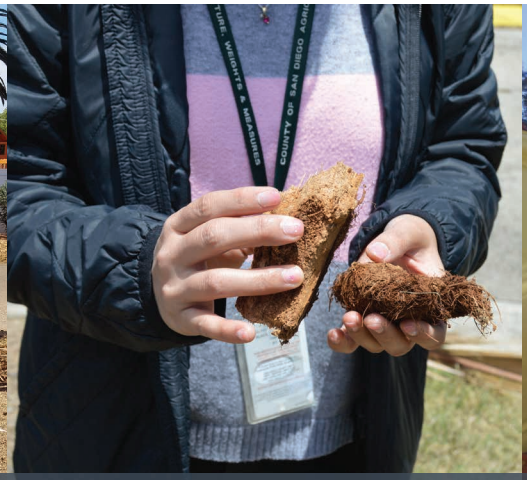
SOUTH AMERICAN PALM WEEVIL

TREATMENT OPTIONS FOR SAPW CONTROL FOR TREE CARE PROFESSIONALS

Palm Tree Removal



Monitoring for Symptoms

Palm Tree Treatment

INTRODUCTION:

Current research shows South American palm weevil is an aggressive pest targeting palm trees, mainly Canary Islands date palms, near the Tijuana/San Diego Border and moving North.

A large factor when determining treatment options is how at risk a certain tree is. Judicious monitoring is required to know how active adult SAPW are in the area. If it is in a high risk area, you will need to develop some kind of insecticide program to control feeding, establishment, and ultimately death to the tree.

SAPW MANAGEMENT TECHNIQUES

1 MONITOR TREES CONSISTENTLY FOR SAPW ACTIVITY.

Early SAPW detection greatly improves the chances of saving

2 DETERMINE TREATMENT FACTORS FOR A SPECIFIC SITE OR TREE.

What is the safest most effective approach for the public, home-owner, and tree?

3 PROTECT TREES WITH A SYSTEMIC INSECTICIDE APPLIED TO EITHER THE TRUNK, CROWN, OR SOIL.

3-4 treatments a year will be needed

4 TREAT TREES WITH INFESTATIONS IMMEDIATELY.

Crown spraying along with a soil systemic has shown to be the most effective control

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TREATMENT OPTIONS
FOR SOUTH AMERICAN PALM WEEVIL

CROWN SPRAYING

Crown spraying is an insecticide treatment applied to the center meristem area, targeting active adults to disrupt their lifecycle. Bifenthrin, imidacloprid, and/or dinotefuran are the active chemicals used in this method.

FACTORS TO CONSIDER:

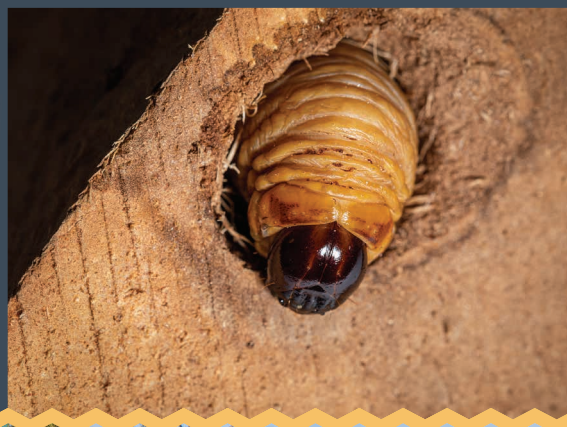
- Public areas, parks, HOA, Riparian/overgrown areas may require special permissions.
- Cannot be applied in weather such as rain, wind, or heat.
- Very tall palms will be difficult to properly drench the crown.

TRUNK & BASAL SPRAY

A systemic insecticide is applied to the outer bark and root flare of the palm.A mixture of Dinotefuran (205) and Pentra Bark are the active chemical agents.

FACTORS TO CONSIDER:

- Faster uptake than other treatment methods.
- Does not last as long as other treatments (2-3 months).



ROOT & SOIL DRENCH

Systemic insecticides are applied to the immediate root zone of the palm tree. The insecticide will trans-locate upward with the new fronds, helping protect against new feeding. A mixture of Imidacloprid (75%), Dinotefuran (20%) are used as the active chemical agents.

FACTORS TO CONSIDER:

- Translocation to the crown can take 60 days or more to complete.
- Soil conditions such as lack of water, runoff or slope can make proper uptake difficult.

When treatment is no longer an option for an infested palm tree, quick removal is imperative to stopping the spread of SAPW to other trees.

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PALM TREE IDENTIFICATION AND SUSCEPTIBILITY

INTRODUCTION:

Palm trees are an iconic part of the Southern California native and maintained landscapes. There are a multitude of native and non-native palm trees planned into street designs, front and back yard landscape features, and grow abundant in riparian areas serving as a source of food and shelter for many animal species. Unfortunately, many of the palm trees we know and love are a food source for the South American palm weevil, but thankfully not all are a suitable host for this massive pest.

PALM IDENTIFICATION GUIDE

Palms are *monocotyledons* in the family Arecaceae. Plants in this family include trees or tree-like shrubs with large evergreen leaves, arranged at the top of an unbranched columnar stem.

PALMS CAN BE DISTINGUISHED BY:

Types of Leaves:

Fronds with or without spines or other protrusions.

- Feather-shaped fronds consist of separate long leaflets that grow from a central stalk (rachis).
- Fan-shaped fronds radiate from a central point along the stem (like fingers on a hand).
- Presence or absence of a crown shaft, a column of leaf bases arranged above the main trunk and below the crown of leaves.

Trunk Characteristics:

Overall size; color; texture; singular or clumping, with smooth surface or covered with scars from old leaves, straight or tapered.

Flowers and Fruit

Growing Conditions & Location

HOSTS

Rhynchophorus palmarum has been reported on 35 plant species in 12 different families. The insect is economically important to palms and sugarcane.

PRIMARY HOSTS

- Cocos nucifera (*coconut*)
- Elaeis guineensis (*African oil palm*)
- Euterpe edulis (*assai palm*)
- Metroxylon sagu (*sago palm*)
- Phoenix canariensis (*Canary Island date palm*)
- Phoenix dactylifera (*date palm*)
- Saccharum officinarum (*sugarcane*)

SECONDARY HOSTS

- Ananas comosus (*pineapple*)
- Annona reticulata (*custard apple*)
- Artocarpus altilis (*Fosberg breadfruit*)
- Carica papaya (*papaya*)
- Citrus spp. (*citrus*)
- Mangifera indica (*mango*)
- Musa spp. (*banana*)
- Persea americana (*avocado*)
- Psidium guajava (*guava*)
- Theobroma cacao (*cocoa*)

ADULTS CAN FEED ON A MULTITUDE OF PLANT SPECIES INCLUDING

- Acrocomia aculeata (*gru gru palm*)[1]
- Ananas sativa (*pineapple*)[4]
- Anona reticulata (*sugar apple*)[4]
- Anona muricata (*soursop*)[4]
- Bactris major (*black Roseau palm*)[1]
- Bambusa sp. (*bamboo*)[2]
- Beta vulgaris (*beet*)[3]
- Brassica rapa (*turnip*)[3]
- Carica papaya (*paw paw*)[5]
- Chrysalidocarpus lutescens (*bamboo palm*)[1]
- Citrullus vulgaris (*watermelon*)[4]
- Citrus aurantium (*orange*)[4]
- Colocasia sp. (*dasheen*)[3]
- Cucumis sativus (*cucumber*)[4]
- Cucurbita pepo (*pumpkin*)[4]
- Daucus carota (*wild carrot*)[4]

1 Succulent Stem | **2** Young Shoot | **3** Tuber | **4** Ripened Fruit | **5** Green and Ripened Fruit

(EPPO, 2007a; Thomas, 2010)

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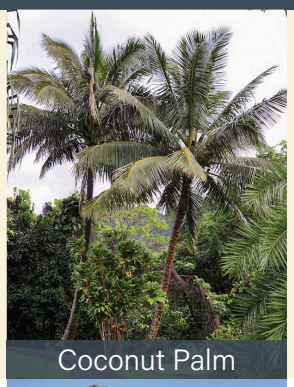
IDENTIFY PALM SPECIES AND SUSCEPTIBILITY TO SAPW


King Palm

ARCHONTOPHOENIX CUNNINGHAMIANA

25 - 50 ft. tall and 10 – 15 ft. wide

Solitary palms native to the rainforests of Eastern Australia. Their trunk is slender and gray and has distinctive ridged rings of leaf scars.
Fronds fall off naturally exposing a clean trunk. they produce small lavender female and male flowers in large hanging inflorescences around the base of the crown shaft from early Spring to Summer, followed by bright red berry-like fruit.
(HOST: UNKNOWN)


Coconut Palm

COCOS NUCIFERA

30 – 100 ft. tall and 12 -30 ft. wide

Original habitat unknown. Is recognized by its slanted, sweeping, white to tan trunk with darker rings, that is swollen at the base. They produce drooping clusters of male or female flowers in the same tree, followed by clumps of coconuts that hang beneath the leaf crown.
(HOST: YES)


Açaí Palm

EUTERPE OLERACEAE

40 – 60 ft. tall and 30 – 50 ft. wide

Native to Brazil, Peru, Suriname, Trinidad and Tobago. They are cultivated for their fruit (acai berries), hearts of palm, leaves and trunk wood. The upper part of the trunk is green and the lower part gray, and it is covered by widely spaced dark rings. They produce clusters of whitish unisexual flowers of both sexes followed by round deep purple fruits when ripe.
(HOST: YES)


Canary Island Date Palm

PHOENIX CANARIENSIS

70 – 90 ft. tall and 25 – 40 ft. wide

It is noted for its massive, thick columnar gray-brown trunk with distinctive dia-mond-shaped leaf scars, and a completely round crown of arching feathered fronds that measure 10 – 20 ft long.

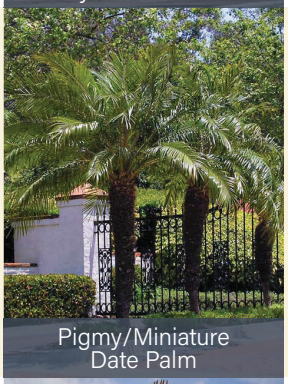
They produce creamy white to pale yellow flowers in dense pendant panicles on male and female plants throughout the year, followed by yellow-orange, date like fruits.
(HOST: YES)


Date Palm

PHOENIX DACTYLIFERA

70 – 90 ft. tall and 20 ft. wide

Date palms can grow singly or can form clumps of several stems from a single root system. Their trunk is columnar, brown to dark gray and with closely set rings of flat "knobs" (scales). Date palms produce yellow female and male flowers in separate plants in the Spring, and produce purple brown edible fruit.
(HOST: YES)


Pigmy/Miniature Date Palm

PHOENIX ROEBELINII

6 – 12 ft. tall and a 3 ft. wide

Dwarf palms native to southeastern Asia. They are distinguished by straight or curvy slender trunks that reach made of shiny leaflets. They produce insignificant clusters of flowers hidden among the leaves throughout the year, followed by jet-black dates which turn red when ripe.
(HOST: BEETLES ATTRACTED TO FRUIT ONLY)


Queen Palm

SYAGRUS ROMANZOFFIANA

50 ft. tall and 20-30 ft. wide

Queen palms are native to South America, but are the most common of the ornamental palms planted in Southern California. Their trunks are covered with leaf bases and fibers near the crown but are smooth and gray below.

Clusters of flowers surrounded buy a woody boat of leaves are produced between the leaves during the spring and summer and are followed by bright orange fruit that accumulate on the ground beneath the canopy.
(HOST: UNKNOWN)


Windmill/Chinese Windmill Palm

TRACHYCARPUS FORTUNEI

40- 65 ft. tall and 6 – 12 in. wide

Solitary palms native to China, Japan, Myanmar and India. Their erect, gray brown rough trunks are matted with brown fibers and remnant leaf bases.

Densely branched clusters of male and female flowers grow on separate plants. Female plants produce kidney-shaped, purplish black fruit during the fall.
(HOST: UNKNOWN)


California Fan Palm

WASHINGTONIA FILIFERA

60 -70 ft. tall | (HOST: UNKNOWN)

California fan Palm is the only palm native to California. It was named in honor of the President of the United States, George Washington. California Fan Palms have a smooth, dark gray, thick columnar trunk and are distinguished for their open crown of fan-shaped leaves with long leaf stalks, and cottony threads that hang from the tips of the leaves. Older leaves persist in the tree forming a skirt. It blooms in the Spring, producing large clusters of tiny flowers followed by small black fruits in the Winter.


Mexican Fan Palm

WASHINGTONIA ROBUSTA

60 to 100 ft. tall

Native to North West Mexico and Baja California. It is distinguished for its remarkable tall, slender and tapered trunks that reach from, and are studded with reddish brown leaf bases on young trees but are smooth and gray on older trees.
(HOST: UNKNOWN)

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