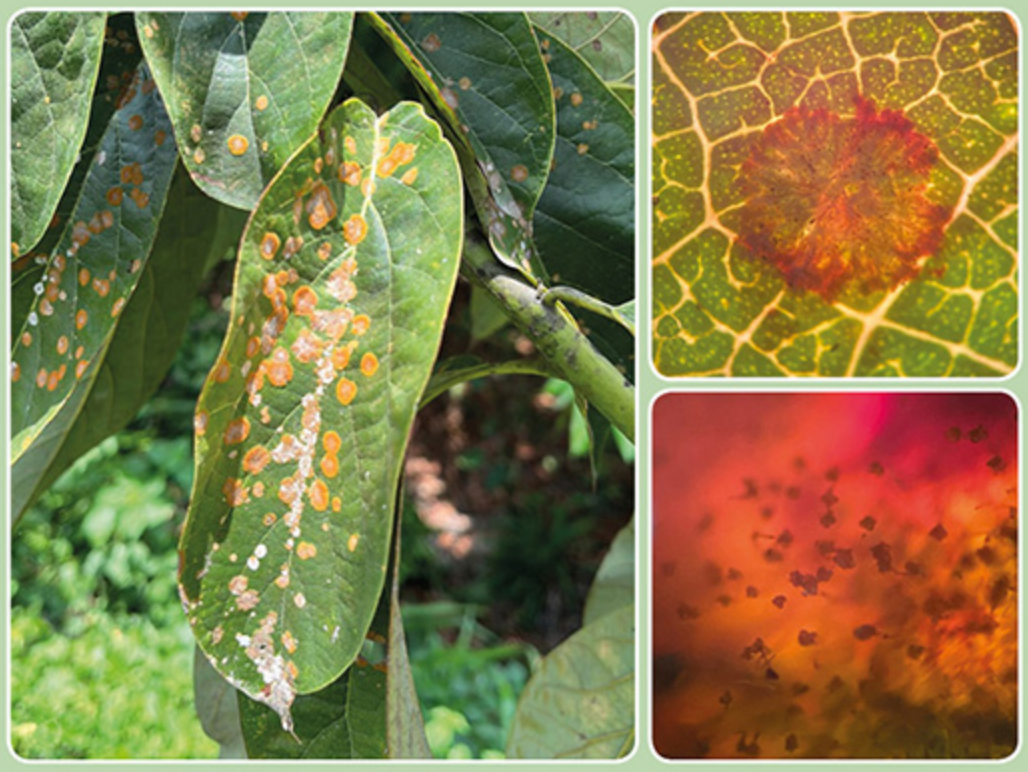
ISSN 1727-1320 (Print),
ISSN 2308-6459 (Online)

ВЕСТНИК ЗАЩИТЫ РАСТЕНИЙ

PLANT PROTECTION NEWS

2025 ТОМ VOLUME 108 ВЫПУСК ISSUE 1



Санкт-Петербург
St. Petersburg, Russia

OECD+WoS: 1.06+QU (Microbiology) https://doi.org/10.31993/2308-6459-2025-108-1-16822

Short communication

FIRST REPORT OF THE NATURAL INFECTION OF *CEPHALEUROS VIRESCENS* CAUSING ALGAL SPOT ON AVOCADO LEAVES IN THE PHILIPPINES

M.A. Balendres[1,2]*, R.J. Lapira[1,3]

[1] *Department of Biology, College of Science, De La Salle University, Manila, Philippines*

[2] *Plant and Soil Health Research Unit, Center for Natural Sciences and Environmental Research, De La Salle University, Manila, Philippines*

[3] *Department of Natural Sciences, College of Arts and Sciences, San Beda University, San Miguel, Manila, Philippines*

**corresponding author, e-mail: mark.angelo.balendres@dlsu.edu.ph*

The avocado *Persea americana* is an important tropical fruit that is a good source of vitamins and minerals, as well as fatty acids and lipids. It is also an important fruit tree for growers as a source of livelihood. In April 2024, severe infections of algal spot characterized by circular, orange to brown spots were observed on the leaves of avocado plants grown in Guagua, Pampanga, Philippines. Based on morphology, the pathogen associated with the algal spot was identified as *Cephaleuros virescens*. This is the first confirmed record of *C. virescens* on avocado leaves in the Philippines.

Keywords: foliar pathogen, leaf disease, parasitic alga, *Persea americana*

Submitted: 12.02.2025 *Accepted: 23.05.2025*

Introduction

The avocado *Persea americana* Mill. contains vitamins, minerals, and fatty acids and is rich in polar lipids that have important roles in cell membrane processes (Zafar and Sidhu, 2011; Araújo et al., 2018). This plant, native to Mexico and Central America, is grown in 884,035 hectares in 72 countries with a total production quantity of more than 9 million tons in 2022 (Food and Agriculture Organization …, 2024). More than half of the avocados were produced in South America, with Mexico (28%), Colombia (12%), Peru (9.5%), and Dominican Republic (8%) as top producing countries (Food and Agriculture Organization of the United Nations, 2024). In Southeast Asia, Indonesia is the top producer at 389,000 tons, ranking 6th in the world's production of avocado. The Philippines ranks 33rd, producing 20076 tons of avocado in 2022. *Cephaleuros virescens* is a filamentous green alga that parasitizes plants, mainly infecting the leaves (Nelson 2008). This pathogen is characterized by a thallus that grows primarily on leaf surfaces below the cuticle (Nelson, 2008).

In April 2024, severe algal spot infection was observed on the leaves of avocado *P. americana* grown in Guagua, Pampanga, Philippines. This symptom on avocado leaves has never been reported in the Philippines. Therefore, this study aimed to confirm and verify the algal spot pathogen through morphological characterization.

Materials and Methods

The ten samples were collected from ten two-year-old avocado trees planted with the distance of 4 meters between trees. All samples were placed in envelopes and returned to the laboratory of the Department of Biology, College of Science, De La Salle University, Manila, Philippines. The specimens were deposited in the DLSU Plant and Soil Health Research Unit Microbe Repository. Pieces of the infected leaves were carefully excised with a scalpel. Pathogen samples were mounted on microscope slides with distilled water and covered with a cover slip. The prepared slides were then examined under a light microscope (Nikon Eclipse Ei, Japan).

Results

Symptoms on avocado leaves were the presence of circular, orange to brown spots, usually protruding, which varied in size and were scattered on the adaxial side of the leaves (Fig. 1). No wilting or yellowing of leaves was observed. Morphologically, the pathogen (Fig. 2) had thalli with circular disks growing on the surface of the leaves (Fig. 2a), continuously, with a pseudoparenchymatous growth habit, having slender filament setae (Fig. 2e), terminal sporangiophores that were clumped, and globular to elliptical sporangia (Fig. 2b-d, 2f).

Discussion

Cephaleuros virescens is the most common pathogen causing algal spot disease, found on avocados (Nelson 2008, Suto & Ohtani 2009, Pitaloka et al., 2015). In this study, *C. virescens* has been identified as the pathogen associated with algal spot disease in avocado leaves collected from the Philippines. The symptoms and characteristics of our specimens (see Results section) were similar to *C. virescens* (Suto, Ohtani, 2009, Pitaloka et al., 2015). The infection on leaves only occurred on the adaxial side, and no visible necrotic spots were observed on the abaxial part (Suto et al. 2014). High temperature and relative humidity, which are common conditions in the Philippines, are favorable for the algal spot development (Malaga et al. 2011). This study collected the diseased leaf samples around April 2024, when conditions were hot and dry (no precipitation) but humid (high relative air humidity). The temperature in the Province of Pampanga in April 2024 reached as

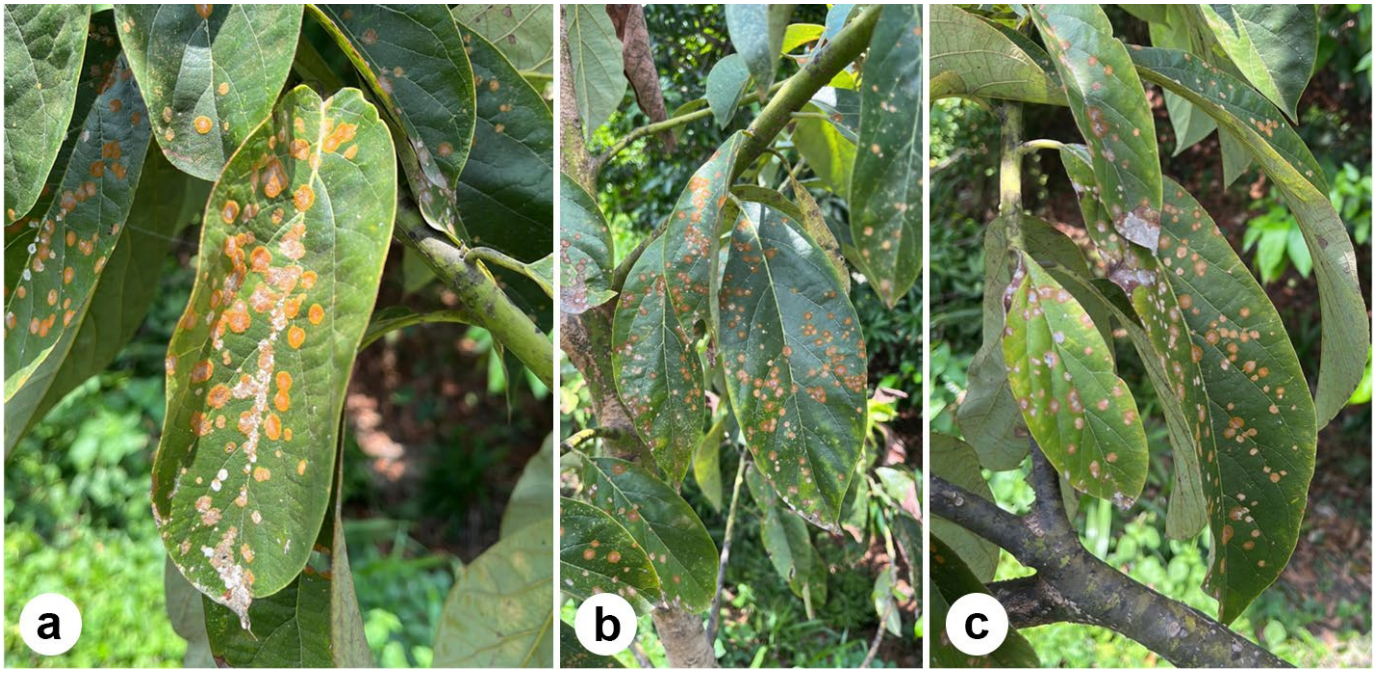


Figure 1. Algal spot disease caused by *Cephaleuros virescens* on avocado leaves

Рисунок 1. Пятнистость, вызванная водорослью *Cephaleuros virescens,* на листьях авокадо

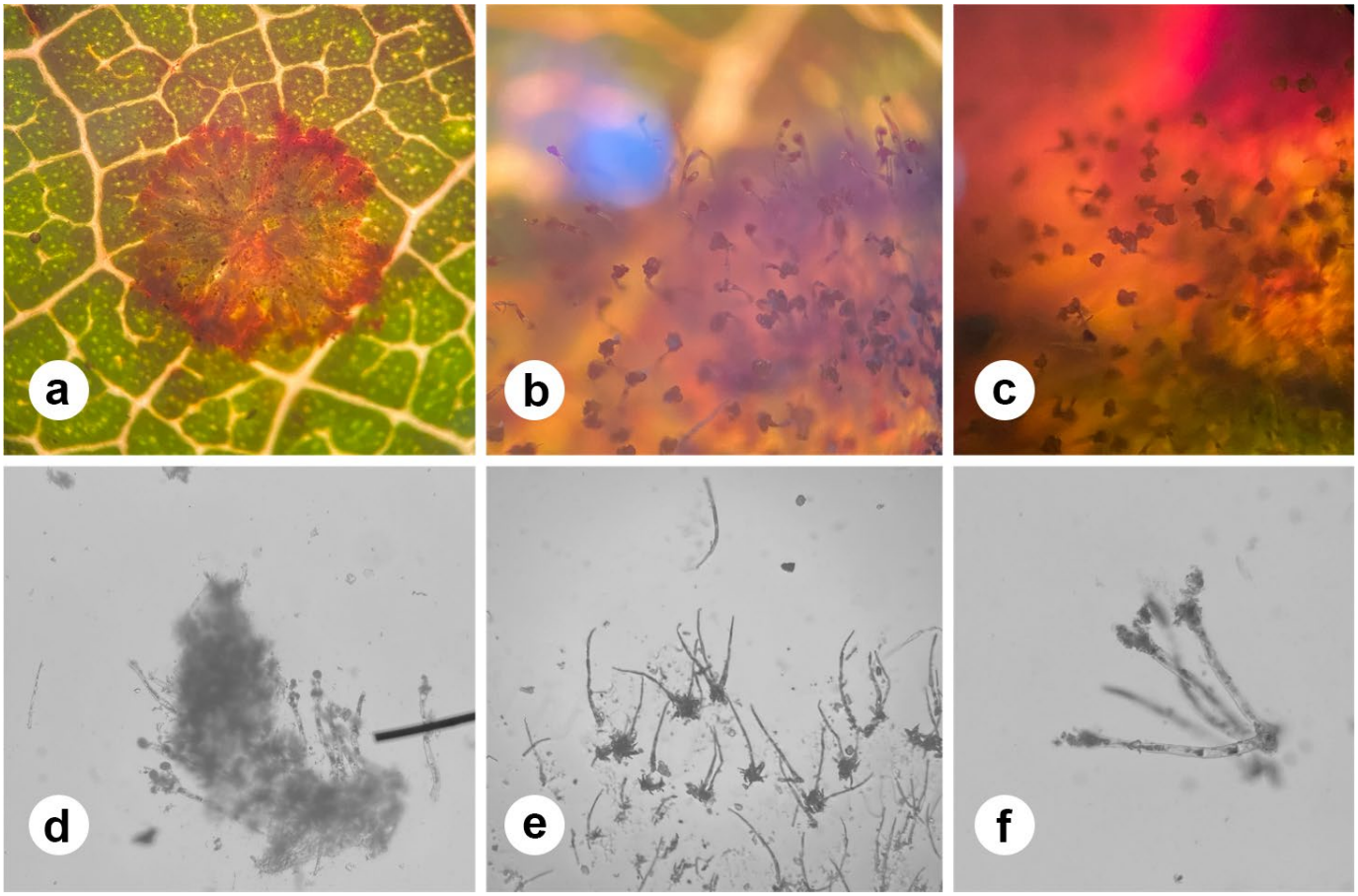


Figure 2. *Cephaleuros virescens* under the light microscope: a, lesion caused by *C. virescens* on the upper leaf; b, c, thallus on the upper leaf with sporangiophores; d, sporangiophores; e, setae; f sporangiophores bearing sporangia

Рисунок 2. *Cephaleuros virescens* в световом микроскопе: a, поражение, вызванное *C. virescens* на верхней стороне листа; b, c, слоевище на верхней стороне листа со спорангиеносцами; d, спорангиеносцы; e, щетинки; f, спорангиофоры, несущие спорангии

high as 37 °C, with 88 % relative humidity. The month prior, the temperature was as high as 35 °C, with relative humidity reaching 94 %. These conditions favored the algal spot development in the area where the avocados were planted.

Algal spot disease have been observed in several trees (e.g., *Chrysophyllum caimito*, *Morus alba*) in several places in the Philippines (Tangonan 1999), but there have been no scientific reports of this pathogen. There is also no record of the deposition of the isolates. This is the first confirmed scientific report of algal spot on avocado leaves. In this study, *C. virescens* was found on avocado plants grown in Guagua, Pampanga, Philippines. While *Cephaleuros* species are known algal spot pathogens, little is known of its distribution, occurrence, and host range in the Philippines, which justifies the need for future studies. Furthermore, investigating the impact of severe algal spot infection in avocado and other tropical plants can provide a better understanding of the importance of this pathogen in commercial production settings. This could lead to research aimed towards an integrated disease management strategy. Basic knowledge about this pathogen would help prepare information and educational materials for awareness about its biology, pathology, and prevention.

Acknowledgments

This study was supported by the Department of Biology, College of Science, De La Salle University.

References

Araújo RG, Rodriguez-Jasso RM, Ruiz HA, Pintado MM et al (2018) Avocado by-products: nutritional and functional properties. *Trends Food Sci Technol* 80, 51–60.

Baliton PS (1990) Survey of algal spot, identification of the causal alga, and studies on host-parasite relationship. BS thesis, UPLB.

Food and Agriculture Organization of the United Nations (2024) https://www.fao.org/faostat/en/#data/QCL (23.05.2025)

Malagi G, Santos I, Mazaro SM, Guginski CA (2011) Detection of algal leaf spot (*Cephaleuros virescens* Kunze) in citrus in Paraná State. *Revista Brasileira de Agrociência* 17:148–152

Nelson SC (2008) *Cephaleuros* species, the plant parasitic green algae. Cooperative Extension Service, University of Hawaii in Manoa. PD–43.

Pitaloka MK, Petcharat V, Arikit S, Sunpapao A (2015) *Cephaleuros virescens*, the cause of an algal leaf spot on Para rubber in Thailand. *Australas Plant Dis Notes* 10:1–4

Suto Y, Ohtani S (2009) Morphology and taxonomy of five *Cephaleuros* species (Trentepohliaceae, Chlorophyta) from Japan, including three new species. *Phycologia* 48:213–236

Suto Y, Ganesan EK, West JA (2014) Comparative observations on *Cephaleuros parasiticus* and *C. virescens* (Trentepohliaceae, Chlorophyta) from India. *Algae* 29:121–126

Tangonan N (1999) Host index of plant diseases in the Philippines, 3rd Edition. Department of Agriculture, Philippines Rice Research Institute, Nueva Ecija, Philippines.

Zafar T, Sidhu JS (2011) Avocado: production, quality, and major processed products. In: Sinha NK (ed) Handbook of vegetables and vegetable processing. Blackwell Publishing Ltd. 525–543. https://doi.org/10.1002/9780470958346.ch26

Вестник защиты растений, 2025, 108(1), с. 50–52

OECD+WoS: 1.06+QU (Microbiology) https://doi.org/10.31993/2308-6459-2025-108-1-16822

Краткое сообщение

ПЕРВАЯ НАХОДКА ПАРАЗИТИЧЕСКОЙ ВОДОРОСЛИ *CEPHALEUROS VIRESCENS* КАК ВОЗБУДИТЕЛЯ ПЯТНИСТОСТИ ЛИСТЬЕВ АВОКАДО НА ФИЛИППИНАХ

М.А. Балендрес[1,2]*, Р.Дж. Лапира[1,3]

[1]Научный колледж, Университет Де Ла Саль, Манила, Филиппины

[2]Центр естественных наук и исследований окружающей среды, Университет Де Ла Саль, Манила, Филиппины

[3]Колледж искусств и наук, Университет Сан-Беда, Сан-Мигель, Манила, Филиппины

**ответственный за переписку, e-mail: mark.angelo.balendres@dlsu.edu.ph*

Авокадо *Persea americana* — важный тропический фрукт, источник витаминов и минералов, а также жирных кислот и липидов. Это важное плодовое дерево для производителей как источник средств к существованию. В апреле 2024 года на листьях растений авокадо, выращенных в Гуагуа, Пампанга, Филиппины, было обнаружено существенное поражение пятнистостью, вызванной паразитической водорослью. Заболевание характеризовалось круглыми оранжево-коричневыми пятнами. На основании морфологического анализа, возбудитель был идентифицирован как *Cephaleuros virescens*. Это первая подтвержденная находка *C. virescens* на листьях авокадо на Филиппинах.

Ключевые слова: листовой патоген, болезнь листьев, паразитическая водоросль, *Persea americana*

Поступила в редакцию: 12.02.2025 *Принята к печати: 23.05.2025*