Received: 23 October 2024 | Accepted: 5 December 2024

DOI: 10.1002/ndr2.70011

New Disease Reports Open Access BSPP WILEY

NEW DISEASE REPORT

First report of *Austropuccinia psidii* on *Syzygium buxifolium* grown as indoor bonsai in Europe

B. Ruffner[1] | **L. Beenken**[2] | **Q. Kupper**[1] | **J. Mittelstrass**[1] | **P. Schuler**[3,4] | **J. E. Stewart**[5] | **J. R. Ibarra Caballero**[5] | **R. Winiger**[1] | **S. Prospero**[1]

[1]Swiss Federal Institute for Forest, Snow and Landscape Research WSL, Phytopathology, Birmensdorf, Switzerland

[2]Swiss Federal Institute for Forest, Snow and Landscape Research WSL, Forest Protection, Birmensdorf, Switzerland

[3]Swiss Federal Institute for Forest, Snow and Landscape Research WSL, Community Ecology, Functional Plant Ecology, Birmensdorf, Switzerland

[4]Plant Ecology Research Laboratory PERL, School of Architecture, Civil and Environmental Engineering ENAC, Lausanne, Switzerland

[5]Department of Agricultural Biology, Colorado State University, Fort Collins, Colorado, USA

Correspondence
B. Ruffner, Swiss Federal Institute for Forest, Snow and Landscape Research WSL, Phytopathology, Zürcherstrasse 111, 8903 Birmensdorf, Switzerland.
Email: beat.ruffner@wsl.ch

Funding information
Swiss Federal Office for the Environment (FOEN)

KEYWORDS
boxleaf eugenia, invasive fungal pathogens, myrtle rust, phytosanitary risk, plant trade

In May 2024, bright yellow pustules were observed on the stems and leaves of a boxleaf eugenia (*Syzygium buxifolium*) plant sold as an indoor bonsai at a Swiss branch of a large European garden retailer. Four additional branches of the same garden retailer were thereafter visited, and one diseased *S. buxifolium* plant was collected from each. The total number of diseased plants at each branch was not systematically assessed.

Early symptoms included red-purple spots on leaves and shoots, progressing to bright yellow uredinia (Figure 1). Older lesions turned brown with sub-angular margins, causing petiole and shoot deformation, occasionally leading to leaf and twig dieback. Microscopy confirmed the presence of pyriform to spherical, echinate urediniospores (16–24 × 13–20 µm; Figure 2), no teliospores were detected. The host and morphological information suggested that the rust was caused by *Austropuccinia psidii* (Beenken, 2017). To verify the identification, DNA was extracted from all diseased plants and the ITS2-LSU region was sequenced using rust-specific primers Rust2inv, LRust1R, LRust2 and LR6 (Beenken et al., 2012). The sequences obtained were identical to GenBank Accession No. OR082910 (*A. psidii* from *Syzygium jambos*). Four of the five plants sampled were confirmed to be infected

FIGURE 1 Myrtle rust symptoms caused by *Austropuccinia psidii* on *Syzygium buxifolium*.

with *A. psidii*. Using four microsatellite markers (PpSSR012, PpSSR014, PpSSR018, PpSSR087), the strains were further identified as belonging to the pandemic biotype associated with the emergence of myrtle rust on various hosts across different geographic regions (Stewart *et al.*, 2018). The sequences were submitted to GenBank (PQ039749–

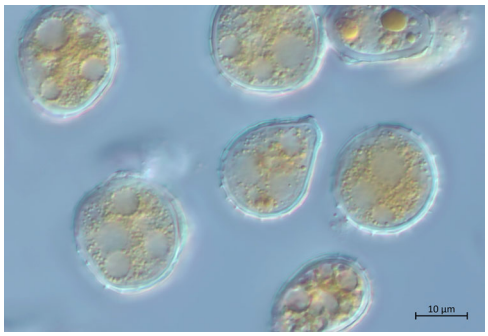

FIGURE 2 *Austropuccinia psidii* urediniospores from the infected *Syzygium buxifolium* plant.

FIGURE 3 Myrtle rust symptoms on inoculated *Myrtus communis* plant.

PQ039752) and preserved plant material was deposited in ETH Zurich (ZTMyc66432).

Pathogenicity tests were conducted on *S. buxifolium* and common myrtle (*Myrtus communis*), a susceptible host native to Europe (Paap et al., 2023). A spore suspension (4×10^6 spores/ml with 0.05% Tween 20) was sprayed onto plants. After five days, brown discolouration and lesions appeared on both hosts, followed by uredinia development 11 days post-inoculation (Figure 3), completing the disease cycle. The identity of the pathogen as *A. psidii* was confirmed by microscopy and DNA sequencing. The pathogenicity tests included a control treatment for both hosts where plants were sprayed with 0.05% Tween 20 solution without spores, and no symptoms developed on these plants.

Upon detection of *A. psidii*, all infected plants were removed from sale and destroyed. Details of how long the plants were on sale or how many were sold are unavailable. The risk of an outbreak in Switzerland is considered low due to unsuitable climatic conditions and the absence of native host species. However, the retailer's European wide distribution network poses a phytosanitary risk, particularly in regions like Italy where susceptible native species and favourable climates exist.

This is the first report of *A. psidii* causing rust disease both in Europe and on *S. buxifolium*. The finding emphasizes the phytosanitary risks associated with the international plant trade. Although *A. psidii* was removed from the European and Mediterranean Plant Protection Organization (EPPO) Alert List in 2003 (EPPO, 2003), it remains a significant concern in certain areas. For example, the pathogen is listed on the UK Plant Health Risk Register and subject to statutory action to prevent its establishment and spread. The detection of *A. psidii* in retail is concerning, especially given its potential impact on species such as common myrtle, native to the European Maquis shrubland, and the economically important *Eucalyptus* genus. Ornamental *Eucalyptus* plants were located near the infected sporulating bonsai plants in the garden centre, though their susceptibility to *A. psidii* was not assessed. The infected bonsai plants were traced to a nursery in the Netherlands, as indicated by the plant passport registration number. The introduction of *A. psidii* via the plant trade could serve as reservoir for the pathogen and be highly detrimental in non-native habitats. The expanded host range and recent interception within the EPPO region have led the Panel on Phytosanitary Measures to re-add *A. psidii* to the EPPO Alert List (EPPO, 2024).

ACKNOWLEDGEMENTS

We thank Antonello Speroni and Sven Orbach. The laboratory testing was supported by the Swiss Federal Office for the Environment (FOEN).

ORCID

B. Ruffner https://orcid.org/0000-0001-9848-2500
L. Beenken https://orcid.org/0000-0001-8663-7616

REFERENCES

Beenken, L. (2017) *Austropuccinia*: a new genus name for the myrtle rust *Puccinia psidii* placed within the redefined family Sphaerophragmiaceae (Pucciniales). *Phytotaxa*, 297, 53–61. https://doi.org/10.11646/phytotaxa.297.1.5

Beenken, L., Zoller, S. and Berndt, R. (2012) Rust fungi on Annonaceae II: the genus Dasyspora Berk. & M.A. Curtis. *Mycologia*, 104, 659–681. https://doi.org/10.3852/11-068

EPPO. (2003) *Mini data sheet on Puccinia psidii*. https://gd.eppo.int/taxon/PUCCPS/documents [Accessed 10 November 2024]

EPPO. (2024) *EPPO Alert List*. https://www.eppo.int/ACTIVITIES/plant_quarantine/alert_list_fungi/austropuccinia_psidii [Accessed 10 November 2024]

Paap, T., Santini, A., Rodas, C.A., Granados, G.M., Pecori, F. and Wingfield, M.J. (2023) *Myrtus communis* in Europe threatened by the pandemic and South African strains of the myrtle rust pathogen *Austropuccinia psidii* (Sphaerophragmiaceae, Pucciniales). *NeoBiota*, 84, 41–46. https://doi.org/10.3897/neobiota.84.95823

Stewart, J.E., Ross-Davis, A.L., Graça, R.N., Alfenas, A.C., Peever, T.L., Hanna, J.W. *et al.* (2018) Genetic diversity of the myrtle rust pathogen (*Austropuccinia psidii*) in the Americas and Hawaii: Global implications for invasive threat assessments. *Forest Pathology*, 48, e12378. https://doi.org/10.1111/efp.12378

How to cite this article: Ruffner, B., Beenken, L., Kupper, Q., Mittelstrass, J., Schuler, P., Stewart, J.E. et al. (2024) First report of *Austropuccinia psidii* on *Syzygium buxifolium* grown as indoor bonsai in Europe. *New Disease Reports*, 50, e70011. https://doi.org/10.1002/ndr2.70011