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Comments on three invasive *Rubus* species: *Rubus ellipticus* Smith, *Rubus rosifolius* Smith and *Rubus niveus* Thunb., in Colombia

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Abstract

The occurrences of three invasive *Rubus* species, namely *Rubus ellipticus* Smith, *Rubus rosifolius* Smith and *Rubus niveus* Thunb. are analysed in three locations in Colombia. *R. ellipticus* and *R. niveus* are invasive species that form dense patches and threaten native vegetation. Due to their highly invasive nature, these two species should be given high priority in the development of an eradication programme. *R. rosifolius* was not seen to form thickets or to cause major environmental issues.

Keywords

Rosaceae, fruit, South America, management, alien species, eradication species

Introduction

The *Rubus* genus is a member of the Rosaceae family, which includes more than 800 species worldwide (Espinell-Ortiz et al. 2023). However, the exact number remains unknown (Gao et al. 2023). *Rubus* is notorious for its morphological diversity, taxonomic complexity, sexual and asexual reproduction, and evolutionary features (Kasalkheh et al. 2024). The *Rubus* species diversity hotspots are located in South America, North America, Europe, West Asia, Australasia and China.

Rubus comprises economically important species that include both cultivated and wild forms worldwide (Ramírez 2024). Economically relevant species include the European red raspberry (*R. idaeus* L. subsp. *idaeus*), the North American red raspberry (*R. idaeus* subsp. *strigosus* Michx), the black raspberry (*R. occidentalis* L.) and Mora de Castilla (*R. glaucus* Benth.) (Graham & Woodhead 2009; Ramírez 2023). South American *Rubus* includes potentially useful species that remain underutilised (Romoleroux et al. 2022; Ramírez 2024, Ramírez 2026).

The impact of invasive species is based on biological attributes and the interaction with the local plant community (Renteria et al. 2012). Introduced plants can have negative effects on local plant communities due to their high reproductive rate, chemical interference and natural variability (Callaway & Aschehoug 2000). Invasive *Rubus* species have been particularly effective in adapting to new environments by exploiting a wide spectrum of soil and climatic conditions (Caplan & Yeakley 2010; Gwynne et al. 2025). They form dense shrubs that replace native vegetation and cause environmental problems (Renteria et al. 2012).

Despite the efforts to eradicate alien species and generate conservation plans, invasive *Rubus* species have accidentally or deliberately been introduced in a number of countries. This has caused major problems due to the high growth rate and ease of propagation. The current research note aims to explore the occurrence of *R. ellipticus* Smith, *R. rosifolius* Smith and *R. niveus* Thunb. in three sites in Colombia, evaluate their observed invasive potential and environmental problems, and offer a global perspective.

Materials and Methods

The three *Rubus* species, namely *R. ellipticus*, *R. rosifolius* and *R. niveus*, were observed in three locations

in Colombia. *R. ellipticus* was observed from December to January 2024 in a paddock within the Tibasosa village (5°44'53"N 72°59'56"W) at 2,530 m above sea level (m.a.s.l.) on the bank of a stream outside Tibasosa in Boyacá State, and near Iza village (5°36'45"N 72°58'43"W), Boyacá State, Colombia, from December to January 2025 (Figures 1 and 2). Mean annual temperature and precipitation in Tibasosa are 14 °C and 1168 mm. Mean annual temperature and precipitation in Iza are 18 °C and 2372 mm. *R. rosifolius* was observed growing in home gardens in Tibasosa from December to January 2023 (Figure 3). *R. niveus* was observed growing in home gardens in Bogotá (4°36'34.96"N, 74°4'54.3"W), Cundinamarca State, Colombia, at 2600 m.a.s.l. in July 2023 (Figure 4). The mean monthly rainfall in Bogotá is 76 mm and the mean monthly temperature 12 °C with a daily variation of 13–17 °C (Ramírez et al. 2013). The specimens were identified at the species level using the keys provided by Romoleroux et al. (2022).

Results and Discussion

The three *Rubus* species in the current investigation have been reported in Colombia as invasive (Rosero-Alpala et al. 2024; Jardín Botánico de Bogotá 2026). These three species are not first records for Colombia. Several herbarium specimens have been housed at Herbario Nacional Colombiano, Herbario del Jardín Botánico de Bogotá and Herbario de La Universidad Distrital Francisco José de Caldas, among other institutions. *R. niveus* and *R. rosifolius* have been included in Colombia's Germplasm Repository (Rosero-Alpala et al. 2024). *R. ellipticus* is native to the Indian Subcontinent to southern Central China, Southeast Asia and the Philippines (Table 1) (Royal Botanic Gardens, Kew 2024a). It is a shrub that is mainly covered in sharp prickles about 3–4 mm in length (Figures 1 and 2) (Romoleroux et al. 2022). The leaves are trifoliate and have an obovate shape, ranging in size from 2–7 cm in length and 2–6 cm in width (Figures 1 and 2). The leaflets bear 7 or 8 secondary veins. The upper leaf surface is covered with stipitate glands and hairs. The lower leaf surface has sessile to subsessile glands. *R. ellipticus* bears inflorescences called compact panicles with flowers about 10 mm in diameter and with white petals and greenish sepals. The fruit is an aggregation of drupelets with a distinctive orange colour, measuring approximately 25 mm in length and 20 mm in width (Figures 1 and 2).

In the current study, *R. ellipticus* formed dense

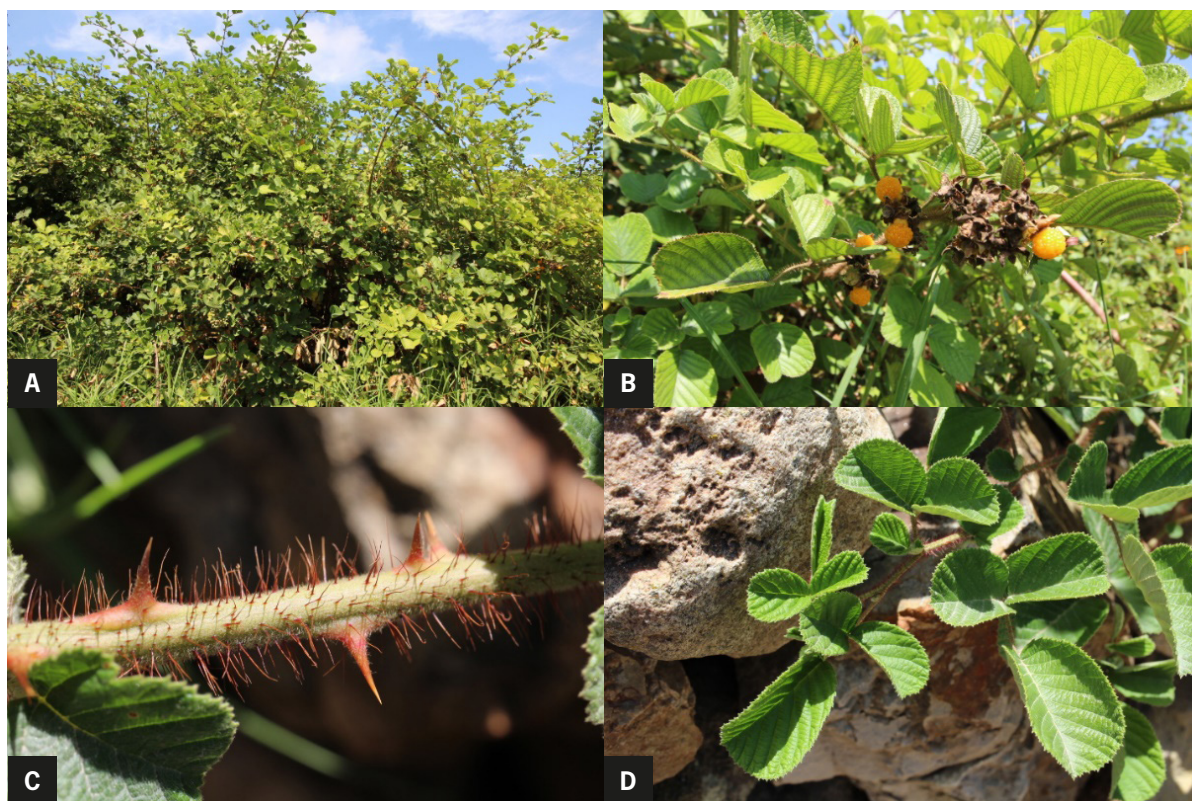


Figure 1. *Rubus ellipticus* from Tibasosa, Boyacá State, Colombia. **A.** Dense bush growing in a paddock. **B.** Fruit and foliage. **C.** Stem with thorns. **D.** Leaves.

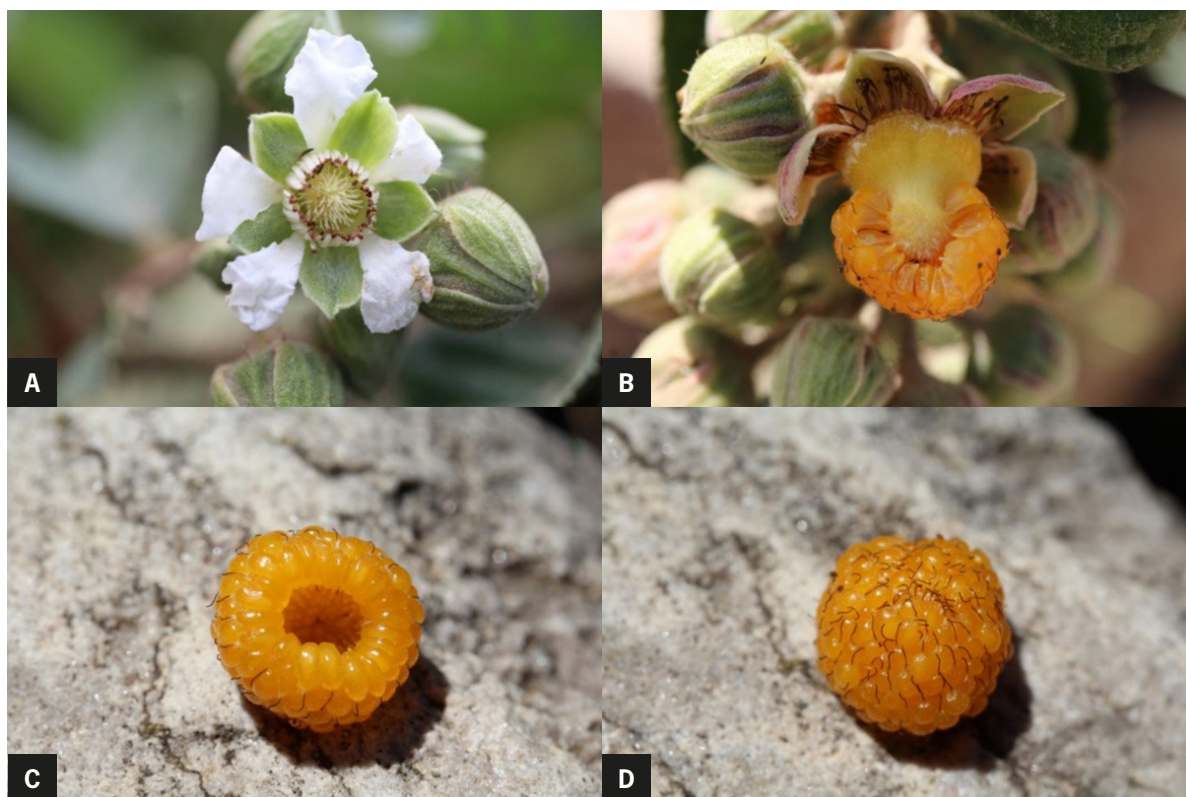


Figure 2. *Rubus ellipticus* flower and fruit. **A.** Flower bearing stamens (outside) and carpels (inside). **B.** Fruit, note the drupelets hanging from the central torus. **C.** Hollow core as viewed from above. **D.** Aggregation of drupelets as viewed from above.

bushes that did not allow any other plant to grow within them (Figure 1A). It was observed in paddocks and growing along a stream. It prevented other plants from growing, including tree seedlings. This suggests that it grows rapidly and outcompetes other plants. There are no known predators or species that help control its high population growth. Due to its high growth rate, it is an invasive species that needs to be removed. This species is catalogued as one of the 100 worst invasive species (Wu & Jialiang 2012). It has become invasive in Aotearoa / New Zealand, Australia, Hawai'i, Africa and South America (Table 1). In Hawai'i, it forms impenetrable thickets (Wu & Jialiang 2012). Recently, Gwynne et al. (2025) reported occurrences of *R. ellipticus* in Albany,

Tāmaki Makaurau / Auckland, Aotearoa / New Zealand. These investigators found only 11 mature individuals, which were not reproductive, plus numerous seedlings. de Lange et al. (2019) documented the first record of *R. ellipticus* var. *obcordatus* (Franch.) Focke., Rosaceae in Aotearoa / New Zealand. These authors found *R. ellipticus* growing in the Gills Scenic Reserve, Albany, along with *R. ulmifolius* Schott, *Ligustrum sinense* Lour., *Jasminum polyanthum* Franch, *Coprosma robusta* Raoul, *Melicytus ramiflorus* J.R. Forst et G. Forst. subsp. *ramiflorus* and *C. macrocarpa* subsp. *minor* A.P.Druce ex R.O.Gardner et Heads × *C. robusta* Raoul. They found 14 individuals that ranged in size between 1 and 5 m tall.

Table 1. Distribution of the *Rubus* species investigated in this article.

Species	Native to	Invasive in	Reference
<i>Rubus ellipticus</i>	South-Central and Southeast China, the Eastern Himalayas, Nepal, Tibet, India, Myanmar, Laos, the Philippines, Pakistan, Thailand, Sri Lanka, Vietnam, Assam	Hawai'i, Jamaica, Ecuador, Colombia, Mozambique, Malawi, Tanzania, Australia (New South Wales, Queensland), Aotearoa / New Zealand, Java	Kew 2024a Gwynne et al. 2025 de Lange et al. 2019 Jardín Botánico de Bogotá 2026
<i>Rubus rosifolius</i>	North-Central, South-Central, and Southeast China, the Eastern and Western Himalayas, India, Borneo, Assam, Cambodia, Java, Laos, Nepal, New Guinea, Sri Lanka, Thailand, Myanmar, Philippines, Vietnam, Taiwan, Sulawesi, the Bismarck Archipelago	Guatemala, El Salvador, Puerto Rico, Brazil, Peru, Colombia, Argentina, Bolivia, Cameroon, Ethiopia, Malawi, Mauritius, Uganda, Zambia, Tanzania, Zimbabwe, Eswatini, Rwanda, Comoros, Aotearoa / New Zealand, Réunion, Hawai'i, Vanuatu, Australia (New South Wales, Victoria), Trinidad and Tobago	Kew 2024c
<i>Rubus niveus</i>	Afghanistan, North-Central and South-Central China, Eastern and Western Himalayas, India, Nepal, Tibet, Laos, Assam, Pakistan, Sri Lanka, Java, Thailand, Myanmar, Vietnam, Taiwan	Florida, Hawai'i, Guatemala, Nicaragua, El Salvador, Brazil, Ecuador, Bolivia, Colombia, Trinidad and Tobago, Zimbabwe, Ethiopia, Cape Provinces, Kenya, Zambia, Swaziland, Malawi, Tanzania	Kew 2024b Rosero-Alpala et al. 2024

R. rosifolius is a species native to Central and Southern China and tropical Asia (Table 1) (Royal Botanic Gardens, Kew 2024c). It is a shrub that bears scattered sessile glands and has terete stems with thorns about 1.5–3.4 mm in length that are curved (Romoleroux et al. 2022). Leaves can be five- to seven-foliate, and each leaflet is around 8 cm long and 4 cm wide (Figure 3). The inflorescence is a terminal cyme with white-petalled flowers that are approximately 25 mm in diameter. The fruits are reddish, about 20 mm long and 16 mm in diameter (Figure 3).

R. rosifolius was observed growing in home gardens and was not seen along forested areas (Figure 3). However, this species has been observed growing along roads and exposed sites in Carchi and Loja provinces, Ecuador (Espinell-Ortiz & Romoleroux 2020). In the current study, people grow this plant in home gardens because the fruits are edible. This species does not seem to cause environmental problems, as plants were not observed in forests or forming dense bushes that do not allow other plants to grow among them. It is invasive in Australia, South and Central America, and



Figure 3. *Rubus rosifolius* from Tibasosa, Boyacá State, Colombia. **A.** Fruit. **B.** Foliage.

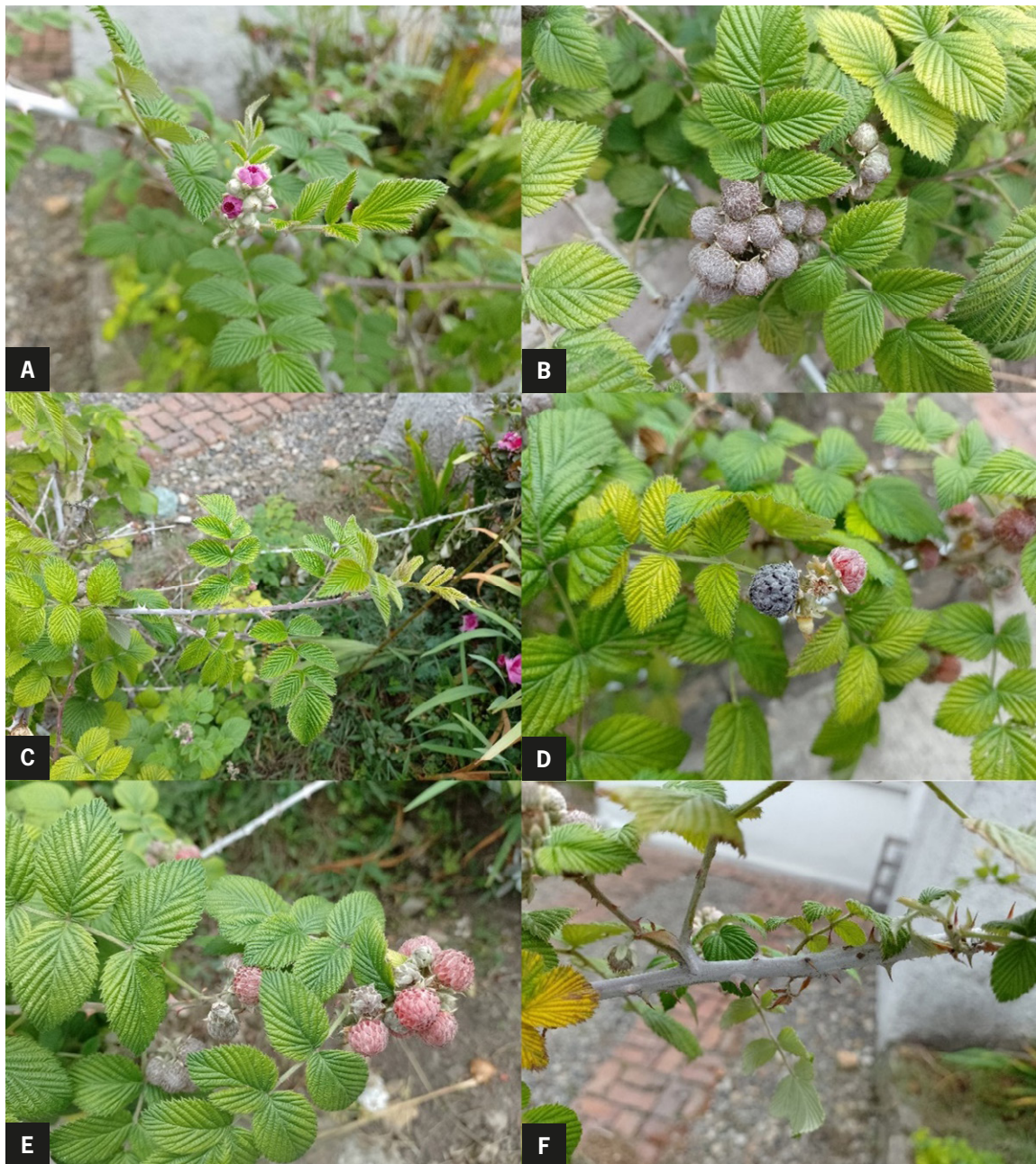


Figure 4. *Rubus niveus* from Bogotá, Cundinamarca State, Colombia. **A.** Flowers and floral buds. **B.** Immature fruit. **C.** Foliage. **D.** Mature fruit (black) and immature (red). **E.** Immature reddish fruits. **F.** Stem with thorns.

Africa (Royal Botanic Gardens, Kew 2024c). In Hawai'i, it is regarded as the least invasive of the *Rubus* species despite being the most widespread (Randell et al. 2004).

R. niveus is native to Afghanistan to Central China, Southeast Asia, India, Indonesia, Java and the Philippines (Table 1) (Renteria et al. 2012). It is a scandent shrub with terete stems and thorns, with a broad base measuring 7–10 mm in length (Romoleroux et al. 2022); leaves are five- to seven-foliate, and leaflets measure about 75 mm in length and 50 mm in width; the inflorescence is a thyrse, and bears flowers with purple petals; the fruit is about 15 mm long and 15 mm in diameter, and dark purple when mature (Figure 4). In the current study, it was observed growing in a home garden in Bogotá, Colombia. It was not observed growing in forested areas. However, this species grows quickly and forms dense patches that threaten native vegetation and rare endemic plants in the Galápagos Islands, Ecuador (Renteria et al. 2012). On a global scale, it is invasive in North, Central and South America, and Africa (Royal Botanic Gardens, Kew 2024b).

Conclusion

Rubus ellipticus and *R. niveus* are invasive species that form dense patches and threaten native vegetation. Due to their highly invasive impact, these species should be the subject of a rapid eradication programme. These three species may be more widespread than is known, because, to date, in the studied regions, there has been little research. However, Colombia has a management plan for invasive species, including *Rubus* sp., but it only mentions this genus as invasive, and does not propose eradication or control actions at the species level. In the current study, *R. rosifolius* did not form thickets or cause major environmental issues. Invasive species of *Rubus* have been successfully eradicated at small scale on Santa Cruz Island, Galápagos, Ecuador (Buddenhagen 2006). This is the case with *R. adenotrichos* Schltdl. and *R. megalococcus* Focke, both invasive species that did not produce viable seed in Santa Cruz, Galápagos. These species were able to be eradicated because they did not produce fruits or pyrenes (seeds) and their distribution was small. The eradication process was achieved by applying herbicides, such as a combination of metsulfuron methyl and picloram, as well as glyphosate. However, the eradication of *R. ellipticus* and *R. niveus* is more complex, with the occurrence of fruits and pyrenes, and possible dispersal agents

such as birds and other vertebrates that could aid in the pyrene-dispersal process. In the current study, birds were not observed feeding on the berries. Thus, more research is warranted to determine the relevance of birds and other vertebrates in the dispersal of pyrenes and plants. Another effective measure would be to conduct an assessment of naturalised *R. ellipticus* in a localised area, as has been done in South Africa (Lalla et al. 2018). Based on plant density estimates, Lalla et al. (2018) conducted an initial weed risk-assessment and predicted a high possibility of invasion in South Africa. They also found that this species was at an early stage of invasion. This could help determine the possible eradication measures based on plant density estimates. However, a successful eradication programme would be challenging in the case of large populations or in plants that produce fruits and pyrenes.

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