

Behavioural plasticity and use of indigenous flora by the invasive Gold Dust Day Gecko, *Phelsuma laticauda* (Boettger, 1880), on Réunion Island

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Tropical insular biodiversity is often characterised by high levels of endemism, which help shape a unique biota that defines a region natural identity (Kier et al., 2009; Tershy et al., 2015). When relatively intact, these habitats often constitute effective ecological barriers against plant and animal introductions (Dubos et al., 2025), and may act as refuges for indigenous reptiles. This is particularly important in the context of competition with introduced species, as has been observed in some geckos (e.g., Williams et al., 2020). On Réunion Island, the Gold Dust Day Gecko (*Phelsuma laticauda*) was introduced in 1975 in the Grand Fond area of Saint-Gilles Village (Probst et al., 2022). The species remained locally restricted during the first years following its establishment, before being unintentionally disseminated across the island through human transportation, particularly via vehicles (Deso, 2001; Caceres et al., 2022; Dubos et al., 2023). In recent years, its population has undergone rapid expansion by colonising a wide variety of anthropogenic environments as well as habitat edges in direct contact with indigenous vegetation formations (Claudin et al., 2022).

In Saint-Pierre, a village in the south of Réunion, *P. laticauda* was first recorded in 2012 at the Domaine

du Café Grillé botanical garden, where it occurs in direct contact with the endemic Manapany Day Gecko, *P. inexpectata* Mertens, 1966 (Porcel et al., 2021; Deso et al., 2023). At this site, *P. laticauda* uses both introduced and indigenous plant species as perches (Deso et al., 2023), notably the widespread Mascarene native Common Screw Pine, *Pandanus utilis*. The broad ecological tolerance of the introduced gecko has allowed it to occupy most available habitats, but it did not move into the restored native/endemic forest habitat of the garden for a while (Porcel et al. 2021; Deso et al., 2023). However, over the past two years, *P. laticauda* has become a resident on the edges of these restored areas and has recently been seen to explore patches of indigenous vegetation.

In order to document our observations, we provide a list of the indigenous and endemic plant species where we observed *P. laticauda* (Table 1), and we highlight the nature of the associated functions (feeding, thermoregulation, retreat, reproduction, or commuting). We assigned behavioural categories based on direct field observations. We assigned "feeding" when active food consumption or foraging behaviour was observed, "thermoregulation" when individuals remained stationary in a sun-exposed position, "retreat" when plants were used as shelter sites, and "reproduction" when eggs or recently hatched juveniles were recorded on a plant. "Commuting" refers to individuals observed moving across a plant without exhibiting the other behaviours.

Across the 21 plant species listed, we documented 52 instances of gecko behaviour (Table 1). Commuting behaviour was recorded on 19 of 21 (90.5%) plant species, thermoregulation on 18 (85.7%), feeding on ten (47.6%), retreat on four (19.0%), and reproduction on one (4.8%) species. The data presented originate from herpetological surveys and continuous monitoring of *P. inexpectata* populations from 2025–2026 as part of several ongoing studies in areas of sympatry with

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Table 1. List of the 21 indigenous plant species used by *Phelsuma laticauda* at the Domaine du Café Grillé botanical garden, with indigeneity status (Endemic to Réunion Island, E_R; Endemic to the Mascarene Archipelago, E_M; or Native, N) and the plant's function in gecko behaviour.

No.	Species	Status	Function
Anacardiaceae			
1	<i>Poupartia borbonica</i>	E _M	Commuting / Thermoregulation
Araliaceae			
2	<i>Polyscias cutispongia</i>	E _R	Commuting / Feeding
Arecaceae			
3	<i>Dictyosperma album</i>	E _M	Commuting / Thermoregulation/ Feeding
4	<i>Latania lontaroides</i>	E _R	Retreat / Commuting / Thermoregulation/ Feeding
Asparagaceae			
5	<i>Dracaena reflexa</i>	N	Commuting / Thermoregulation/ Feeding
Aspleniaceae			
6	<i>Asplenium nidus</i>	N	Commuting / Thermoregulation
Asteraceae			
7	<i>Psiadia retusa</i>	E _R	Commuting / Feeding
Combretaceae			
8	<i>Terminalia bentzoë</i>	E _M	Commuting / Thermoregulation
Ebenaceae			
9	<i>Diospyros borbonica</i>	E _R	Commuting
Goodeniaceae			
10	<i>Scaevola taccada</i>	N	Commuting / Thermoregulation/ Feeding
Malvaceae			
11	<i>Dombeya acutangula</i>	E _M	Commuting / Thermoregulation
12	<i>Hibiscus columnaris</i>	E _M	Commuting / Thermoregulation
Oleaceae			
13	<i>Olea lancea</i>	N	Commuting / Thermoregulation
Pandanaceae			
14	<i>Pandanus purpurascens</i>	E _R	Retreat / Thermoregulation/ Feeding
15	<i>Pandanus sylvestris</i>	E _R	Retreat / Commuting / Thermoregulation/ Feeding
16	<i>Pandanus utilis</i>	N	Retreat / Thermoregulation/ Feeding / Reproduction
Polypodiaceae			
17	<i>Phymatosorus scolopendria</i>	N	Commuting / Thermoregulation
Sapindaceae			
18	<i>Dodonaea viscosa</i>	N	Commuting / Thermoregulation
19	<i>Doratoxylon apetalum</i>	N	Commuting / Thermoregulation
Urticaceae			
20	<i>Obetia ficifolia</i>	E _M	Commuting / Thermoregulation
Xanthorrhoeaceae			
21	<i>Aloe macra</i>	E _R	Commuting / Thermoregulation/ Feeding

P. laticauda. We used photographic records and took notes continually to document the use of indigenous flora by *P. laticauda* (Fig. 1). In addition, a food selectivity protocol concerning dietary choices of *P. inexpectata* also allowed opportunistic documentation of certain feeding preferences of *P. laticauda* (unpubl. data).

Based on field observations conducted using a GPS device in the botanical garden, *P. laticauda* was recorded on a total of 21 native plants, including 14 endemic species (Table 1). We recorded feeding behaviours on the fruits, flowers, or exudate of seven endemic plant species. In addition, the geckos used the endemic

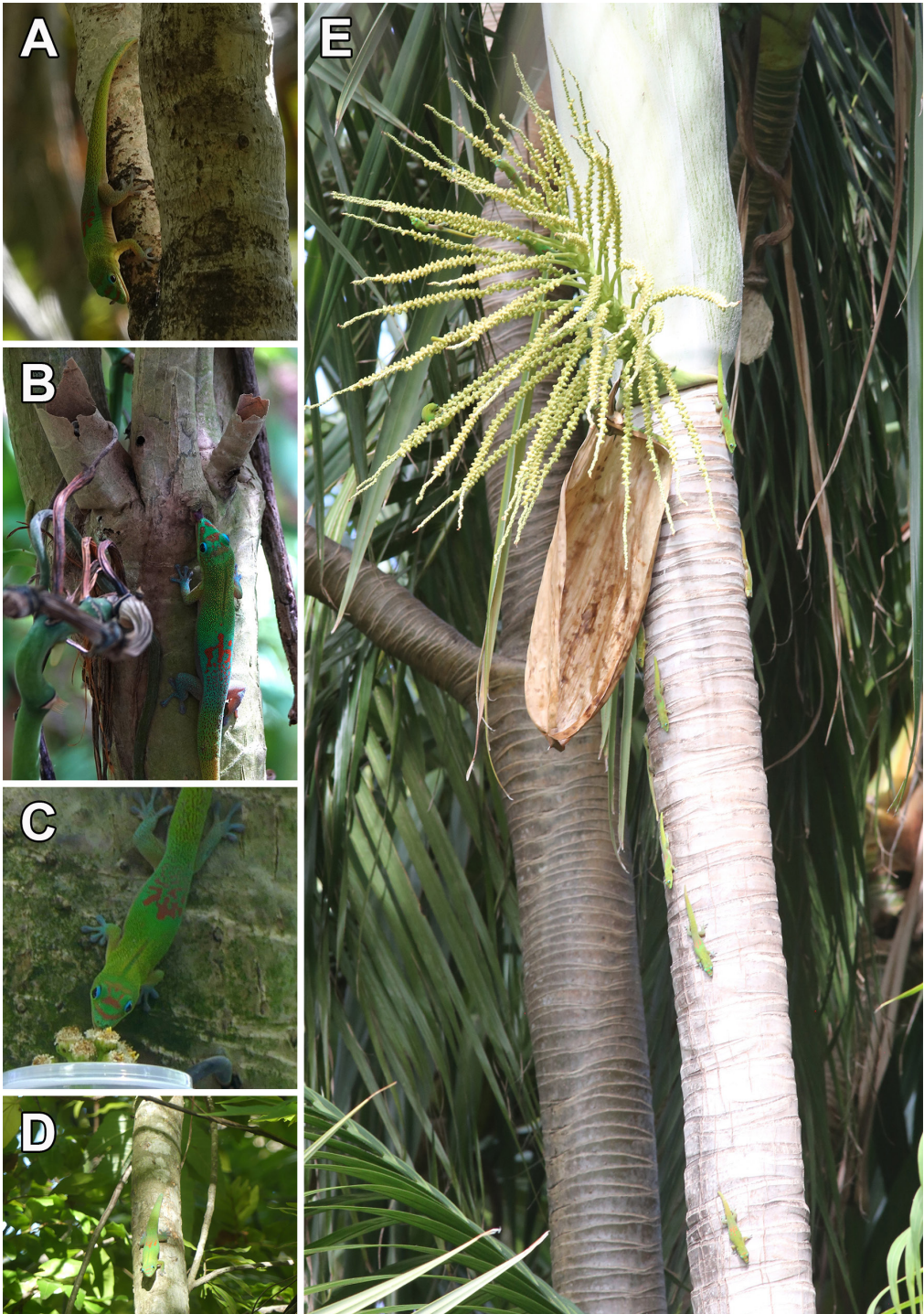


Figure 1. (A) An adult *Phelsuma laticauda* feeding on microinvertebrates on *Polyscias cutispungia* within an indigenous forest habitat. (B) An adult *Phelsuma laticauda* feeding on an undetermined plant exudate of *Dracaena reflexa* within an indigenous forest stand of the park. (C) An adult *Phelsuma laticauda* feeding on floral exudates of *Psiadia retusa*. (D) Individual adult moving and basking on *Obetia ficifolia*. (E) Colony of *Phelsuma laticauda* (14 individuals) on a flowering *Dictyosperma album*. Photos by Grégory Deso (A, B), Jean-Michel Probst (D, E), and Léa Soler, Théo Neyhouser, Shiva Moutoucomorapoule (E).

Sponge Wood (*Polyscias cutispongia*) to search for invertebrates, notably plant hoppers (Hemiptera) (Roesch, 2025), but also for the consumption of plant sap (Fig. 1A). These behaviours were observed in sympatry with the endemic *P. inexpectata*. Among native taxa, we observed *P. laticauda* feeding only on the evergreen coastal scrub *Scaevola taccada*, whereas two species, the hopbush (*Dodonaea viscosa*) and the Monarch Fern (*Phymatosorus scolopendria*) were used solely for commuting or thermoregulation.

These observations suggest that after establishment of a beachhead population at the time of invasion, *P. laticauda* may enter a dispersal phase, during which it explores habitats it appeared to avoid during the early stages of introduction. This expansion does not only occur in adjacent anthropogenic environments but also in more isolated sectors that are more strongly embedded within the landscape of the island. These areas may comprise mosaics of endemic and introduced plants, and *P. laticauda* has recently been observed in contact with the endemic Réunion Island Day Gecko (*P. borbonica* Mertens, 1966), in the La Montagne District of Saint-Denis in the north of Réunion Island, terrain deeply embedded within the island's relief (Claudin et al., 2022). However, in sites where *P. inexpectata* is present, the density of *P. laticauda* seems lower than in exotic-dominated habitats where *P. inexpectata* is much rarer. These observations also indicate that *P. laticauda* can use indigenous and endemic plant structures that are sometimes more complex and less standardised than those commonly exploited in anthropogenic environments, such as *Pandanus* or *Cocos nucifera*. This ability suggests marked behavioural plasticity and an aptitude for learning to use unfamiliar microhabitat options. Such ecological flexibility in lizards, still probably underestimated, have nevertheless attracted increasing interest in recent literature (Shanbhag et al., 2010; Kiss et al., 2015).

Some indigenous vegetation stands on Réunion are now occupied by both *P. laticauda* and *P. inexpectata*. The simultaneous foraging activity of both species on the same endemic tree indicates that the introduced species is able to exploit native plants. Furthermore, a recent study reported the presence of *P. laticauda* among flourishing *P. inexpectata* populations (Sanchez et al., 2025). However, in these situations *P. laticauda* appears to preferentially reside on *Pandanus* structures, as reported in Florida (Krysko and Borgia, 2012). This spatial division likely facilitates the establishment and persistence in syntopy with the endemic gecko.

Nevertheless, the progressive expansion of the *P. laticauda* range into more natural habitats is a risk for native species. Spatial coexistence of these species (e.g., Cadet and Pasco, 2025), observed in habitats that were until now considered less favourable because of their unfamiliarity to the introduced species, sets the stage for competitive exclusion (e.g., Cole et al., 2005).

These observations lead us to consider that the introduced *P. laticauda* represent, in the medium to long term, a potential threat to the endemic Réunion Island day geckos *P. borbonica* and *P. inexpectata*. It has also been predicted that invasion by *P. laticauda* or another invasive day gecko, such as the Madagascar Giant Day Gecko (*P. grandis* Gray, 1870), would likely be able to outcompete endemic reptiles from other regions of the world, such as the Eua Forest Gecko (*Lepidodactylus euaensis* Gibbons & Brown, 1988), on Tonga and the Brown Red-bellied Anole (*Anolis koopmani* Rand, 1961) on Haiti (Dubos et al. 2023). The capacity of *P. laticauda* to exploit novel habitats and coexist spatially with endemic geckos highlight a characteristic feature of successful invaders and underscores the need for proactive management before competitive impacts become more pronounced.

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