



First record of *Nomada duplex* SMITH, 1854 from the Canary Islands (Hymenoptera: Apidae)

Erster Nachweis von *Nomada duplex* SMITH, 1854 für die Kanarischen Inseln (Hymenoptera: Apidae)

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Abstract

Nomada duplex SMITH, 1854 has been recorded for the first time on the Canary Islands. A male of this species was detected on La Palma (Montaña de la Tagoja at 720 m above sea level, about 4.5 km north of Santa Cruz de la Palma), visiting flowers of *Calendula arvensis* (Asteraceae) in a ruderal habitat. We discuss the morphological characteristics of the male in detail and present for the first time a photograph of the genital structure. General information about the distribution area, flight time, and potential host species of *Nomada duplex* on the European and North-African mainland is also presented, and the possible host on La Palma is discussed. Finally, the *Nomada* species from the Canary Islands and their island-specific distribution are presented.

Zusammenfassung

Nomada duplex SMITH, 1854 wird erstmals für die Kanarischen Inseln nachgewiesen. Ein Männchen dieser Art konnte auf La Palma (Montaña de la Tagoja, 720 m ü. M., etwa 4,5 km nördlich von Santa Cruz de la Palma) beim Blütenbesuch an *Calendula arvensis* (Asteraceae) an einem Ruderalstandort festgestellt werden. Wir gehen auf die morphologischen Merkmale des Männchens ausführlicher ein und stellen erstmals die Struktur des Genitals dieser Art mit einem Fotobeleg vor. Allgemeine Angaben über das Verbreitungsgebiet, die Flugzeit und die potenziellen Wirte von *Nomada duplex* auf dem europäischen und nordafrikanischen Festland werden vorgestellt. Der mögliche Wirt auf La Palma wird diskutiert. Wir stellen zudem die bisher nachgewiesenen *Nomada*-Arten der Kanarischen Inseln und ihre inselspezifische Verbreitung synoptisch zusammen.

Introduction

Cuckoo bees (kleptoparasitic bees, brood parasites) lay their eggs in the nests of other bee species (host bees) and use their food supplies. Their larvae kill off the larvae of their hosts. Cuckoo bees are completely dependent on their host bee species and are characterised by specific morphological, behavioural and chemical adaptations. This usually involves very close host-parasite relationships between a brood-parasite species and

only one or a few host bee species (LINSLEY 1958, WESTRICH 1989, MICHENER 2007, DANFORTH et al. 2019).

On the European mainland, cuckoo bees account for around 20% of the approximately 2,137 species of wild bees (GHISBAIN et al. 2025). On oceanic islands, however, there are few species of wild bees and therefore very few species of cuckoo bees. For example, among the 22 species found in the Madeira Archipelago, only one cuckoo species, *Stelis ornatula*, has been detected, in only one individual (KRATOCHWIL et al. 2022). The low

number of wild bees and rarity of cuckoo bee species in island locations is due to their generally difficult colonisation situations requiring a colonisation source from the mainland.

Another highly selective factor for cuckoo bee species is their close host specificity to one or a few host bee species. Thus, any colonisation by a cuckoo bee species requires the presence of a suitable host species in a certain population size. This 'double filter' makes the colonisation and establishment of brood parasites on oceanic islands significantly less likely than that of the non-parasitic wild bee species.

While the Macaronesian archipelagos Azores, Madeira Archipelago, and Cabo Verde exhibit low wild bee species diversity, the Canary Islands have been colonised by a greater number of wild bees, mainly due to their proximity to the mainland and extended evolutionary processes. To date, 30 cuckoo bee species have been identified out of a total of 138 wild bee species in the Canary Islands (data base A. KRATOCHWIL, n.p.). Among the nine genera of cuckoo bees represented, the genus *Sphecodes* dominates with eight species, followed by *Melecta* with six;

Nomada with six; *Thyreus* with three; *Ammobates*, *Di-oxyx* and *Stelis* with two each; and *Epeolus* and *Pseudammobatooides* with one each.

Cuckoo bees on oceanic islands often encounter the problem that their host bees are missing and it is unclear if they are able to switch to other wild bee species as hosts. Such behaviour has yet to be studied in detail in island ecosystems.

In this paper, the first record of *Nomada duplex* SMITH, 1854 from the Canary Islands will be presented. An overview of the morphology, ecology and distribution of this species will be provided, and for the first time, a photo of the male's genital will be presented. Finally, the question of potential hosts will be discussed.

Methods and materials

Data collection

As part of numerous long-term research activities on the Canary Islands, a database of wild bee species and their distribution on the Canary Islands has been created (KRATOCHWIL 2020, KRATOCHWIL et al. 2021, 2022).

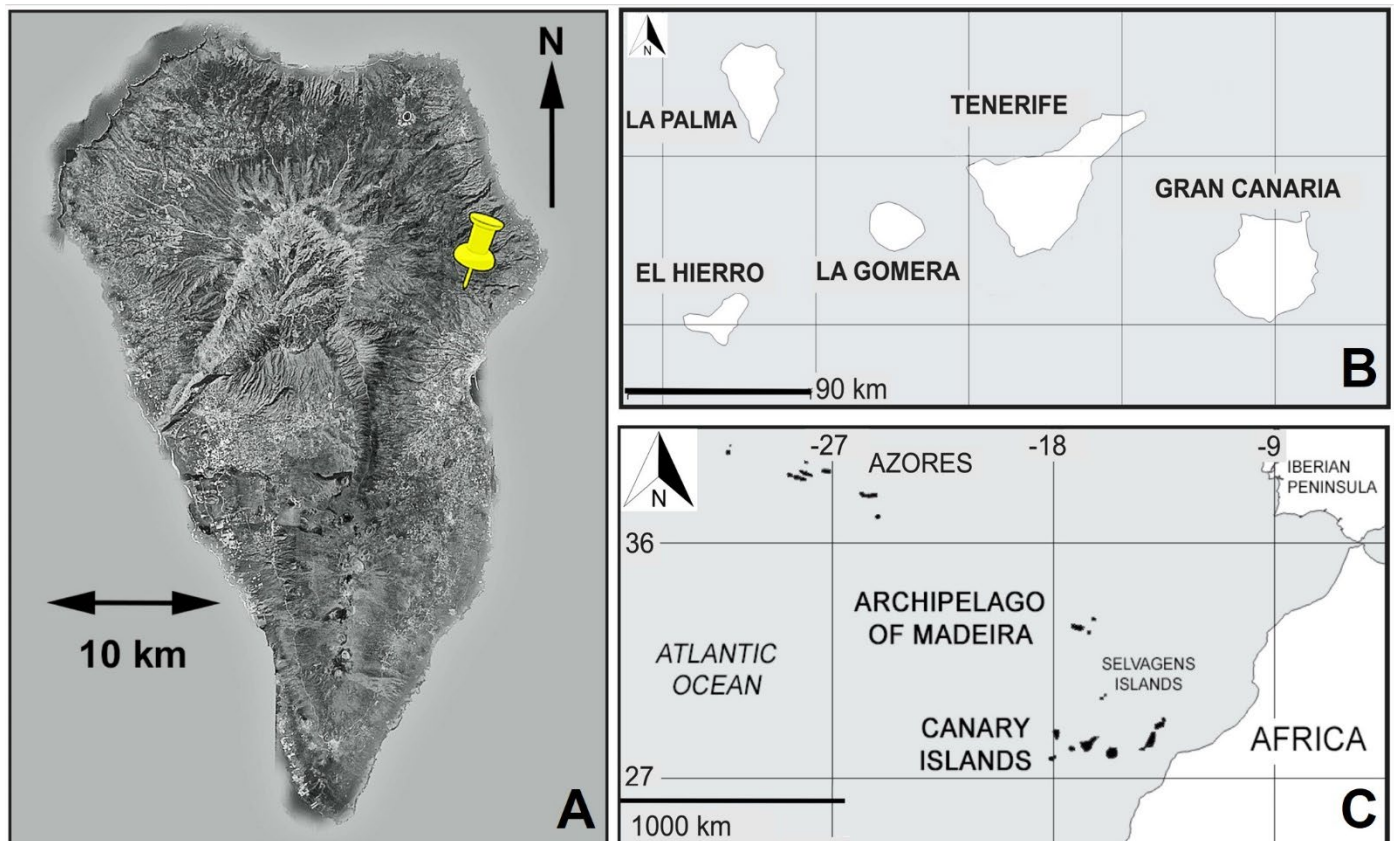


Fig. 1 La Palma, location of the site where *Nomada duplex* was detected (Montaña de la Tagoja, 720 m above sea level) (A), location of La Palma, Canary Islands (B), location of the Canary Islands (C).

Study area

La Palma is the northwesternmost of the Canary Islands, with an area of 708 km² and a maximum elevation of 2,426 m above sea level (Fig. 1). La Palma is 1.72 million years old and, after El Hierro, the second youngest island in the archipelago (CARRACEDO 2011). The north and northeast are influenced by the trade winds, while mainly the south and southwest are drier and warmer. Due to high relief energy from the coastline to the highest elevation, different vegetation zones alternate with altitude: xerophilic succulent and shrub vegetation predominates at lower altitudes, followed by laurel and dry pine forests, dependent on exposure to the trade winds. Sub-alpine vegetation predominates at the highest altitudes (RIVAS-MARTÍNEZ 1996, POTT et al. 2003, RIVAS-MARTÍNEZ 2009, IRL & BEIERKUHNLEIN 2011).

Results and Discussion

Taxonomy

The type specimen of *Nomada duplex* is deposited in the Natural History Museum in London (NHMUK) and originates from Tangier (Morocco) (NATURAL HISTORY MUSEUM 2025). The description refers only to the female (SMITH 1854, SCHWARZ 1989).

Distribution

The distribution range of *Nomada duplex* covers western and southern Europe and North Africa (SMIT 2018), with occurrences in southern France and Corsica, Portugal, Spain, Morocco, Algeria, Tunisia, Libya, Italy, Sicily and Sardinia (SCHWARZ 1977, 1989, 1999, AUBERT et al. 2010, DUFRÊNE et al. 2014, NOBILE & TURRISI 2016, BALDOCK et al. 2018, LHOMME et al. 2020, GASPARD et al. 2022, KHEDHER et al. 2022, CORNALBA et al. 2023, ASCHER & PICKERING 2026). *Nomada duplex* was also detected in the Netherlands in 2024 (GOUDSMITS 2024, vide J. SMIT). The species is classified as introduced.

Location and vegetation zone

The *Nomada duplex* male was detected by A. KRATOCHWIL on 12 March 2015 on La Palma, in the Montaña de la Tagoja at 720 m above sea level, about 4.5 km north of Santa Cruz de la Palma (N28°43'22.6", W17°46'20.5") visiting *Calendula arvensis* (Asteraceae) flowers at a ruderal

site near the road (Fig. 2). Its discovery was a bycatch during the study of the *Andrena wollastoni* group (*Micrandrena*) of the Canary Islands and the Madeira Archipelago (KRATOCHWIL 2020). In terms of the vegetation characterisation of RIVAS-MARTÍNEZ (1996, 2009), it belongs to the subhumid thermo-meso-Canarian macro-series of *Laurus azorica*. Additionally, it is influenced by the trade winds of the eastern slopes of La Palma.

Description of the *Nomada duplex* male

The *Nomada duplex* male has a body size of 11.7 mm and a wing length of 9.4 mm. Its head is black, while the maculations to mandibles, malar area, labrum, border of clypeus, and inner orbital margin are yellow. The antenna is red, the scape is black, and segments 2–7 are black on the dorsal surface. The thorax is black, and the maculations to pronotal lobes, tegulae, and the central spot on the scutellum are yellow. The abdomen is black. Tergum 1 is apically red, and terga 1 and 2 have lateral yellow spots, while terga 3–6 have yellow bands, narrowed on tergum 3. The legs are red, and the femora are basally black. Scutum and propodeum have long erect hairs, and the labrum lacks a tooth. Antennal segment 3 is shorter than segment 4, and segments 3–12 have weak tubercles. The apex of tibia 3 has one red spine. Femur 3 is basally excavated for a third of its length, with a golden hair tuft; coxa 3 also has a golden tuft. The gonostylus is narrow and bent downwards and inwards.

Flight season

For the mainland distribution area, the months of March and April comprise the flight season for this univoltine species. Our detection date was 12 March 2015.

Nomada species of the Canary Islands and potential hosts

Together with *N. duplex*, six *Nomada* species occur on the Canary Islands (Table 1). The most widespread species is *N. b. bifasciata*, which is present on all islands, *N. glaucopis* occurs on five islands, and *N. discrepans* on three. Only *N. duplex*, *N. fenestrata*, and *N. pruinosa* are restricted to one island. All species can be classified as native. Almost all species have hosts that are unknown on the European and North African mainland. *Nomada*

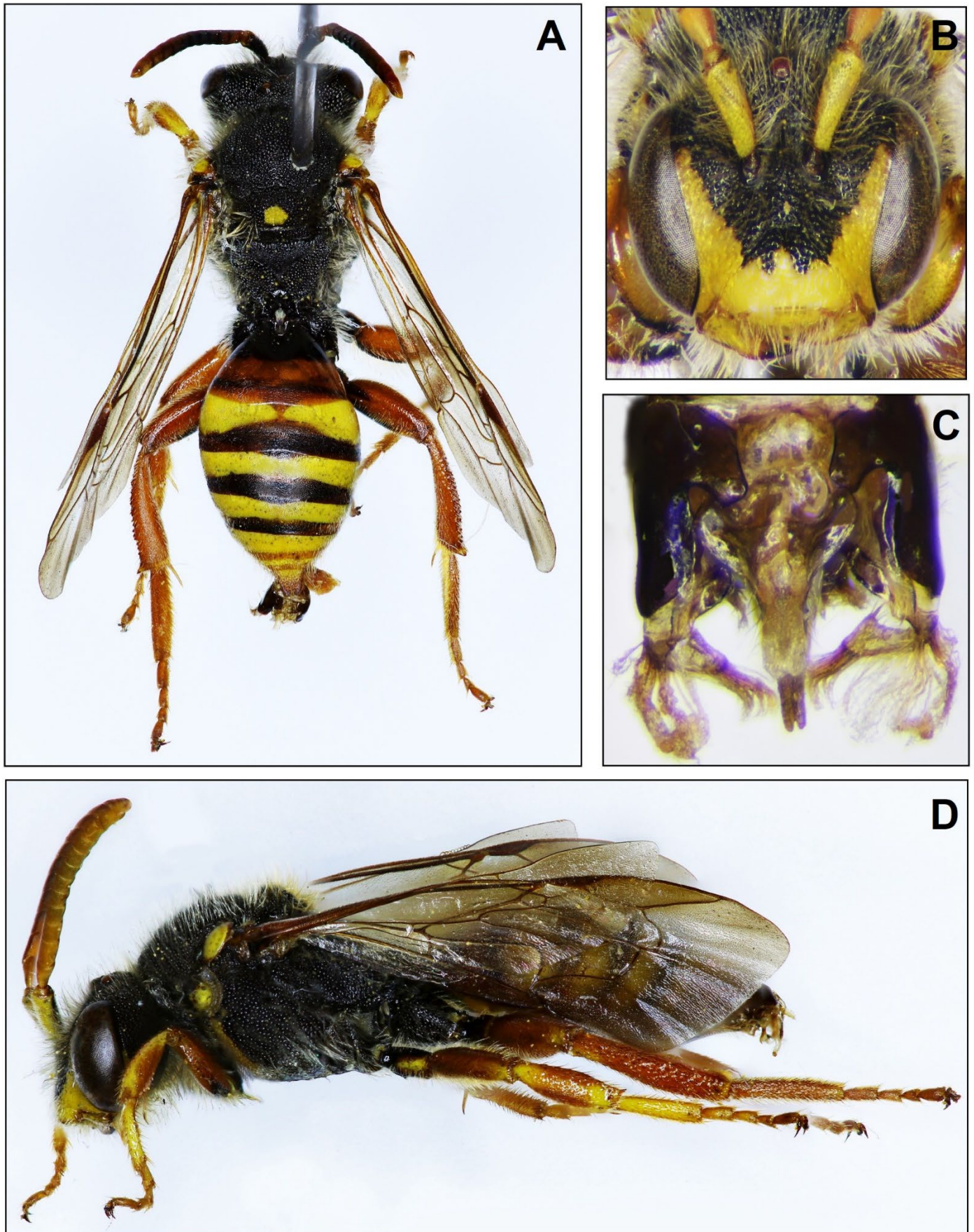


Fig. 2 *Nomada duplex* male from La Palma dorsal (A), head (B), genital (C), male lateral (D).

duplex is an exception. *Andrena binominata* SMITH, 1853 is assumed to be its host on the mainland (Pyrénées-Orientales) (AUBERT et al. 2010). *Andrena florentina* may also serve as a host of *Nomada duplex* (pers. comm. T.J. WOOD, Leiden). However, both of these host species do not occur on La Palma or any of the other islands. In *A. binominata*, tergites 2 and 3 are distinctly red, bearing a certain resemblance to members of the *Andrena savignyi* group with red tergites 1 and 2. *Andrena savignyi* SPINOLA, 1838 does not occur in the Canary Islands, but *A. bipartita* BRULLÉ (1839) (stat. resurrect.), formerly listed as a synonym to *A. savignyi* from the Canary Islands (KRATOCHWIL submitted), does. Furthermore, another closely related species occurs on La Palma (*A. tajogaitensis* sp. nov.; KRATOCHWIL submitted). It can therefore be assumed that *N. duplex* parasitises this species on La Palma, but more observations are needed to confirm this suspicion.

A second *Nomada* species also occurs on La Palma: *N. bifasciata*. SMIT (2018) states that the host of *N. b. bifasciata* on the European mainland is *Andrena gravaida*, which is not present on the Canary Islands. In Spain, however, according to M. SCHWARZ, *Andrena savignyi* could be the host of *N. b. bifasciata* (SMIT 2018). *Nomada bifasciata* occurs on all Canary Islands (Table 1) and is therefore likely to parasitise both *A. bipartita* and *A. tajogaitensis* as hosts.

The *Nomada* species on the Canary Islands are listed in Table 1. The hosts of *N. discrepans*, *N. fenestrata*, *N. glaucopis*, and *N. pruinosa* are unknown.

Acknowledgements

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Table 1 *Nomada* species of the Canary Islands; EH = El Hierro, LP = La Palma, LG = La Gomera, TE = Tenerife, GC = Gran Canaria, FU = Fuerteventura, LA = Lanzarote.

Species	EH	LP	LG	TE	GC	FU	LA
<i>Nomada bifasciata bifasciata</i> OLIVIER, 1811	✓	✓	✓	✓	✓	✓	✓
<i>Nomada glaucopis</i> PÉREZ, 1890	✓			✓	✓	✓	✓
<i>Nomada discrepans</i> SCHMIEDEKNECHT, 1882		✓				✓	✓
<i>Nomada duplex</i> SMITH, 1854		✓					
<i>Nomada fenestrata</i> LEPELETIER, 1841					✓		
<i>Nomada pruinosa</i> PÉREZ, 1890							✓

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