

Short communication

# Species introductions through coconut fibre: *Dactyloctenium aegyptium* and *Glinus oppositifolius*, new records for the Balearic Islands, Spain

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**Abstract** – Based on plant material collected in the forest nursery of the Balearic Island Forestry Center (CEFOR) for autochthonous plant production and the University of the Balearic Islands experimental facilities, two new plant records are presented for the Mediterranean island of Mallorca. *Dactyloctenium aegyptium*, an invasive grass previously recorded in other areas of the Mediterranean basin, and *Glinus oppositifolius*, a new record for the European flora. In both cases the species are presumed to have arrived through contaminated batches of the coconut fibre substrate used in both facilities.

**Keywords:** Balearic Islands, coconut fibre, exotic species, substrate, plant invasions

## Introduction

Allochthonous species are recognized as one of the main threats worldwide to biodiversity. Plant nurseries and other facilities dedicated to plant production are known to be an important centre of alien plant introductions. In this sense, recent studies have focused specifically on propagules contained in substrates, pointing out the specific role of coconut fibre substrate as a possible vector of long-distance weeds. This pattern has been extensively recorded in at least two regions: in New Zealand (Popay et al. 2008) and Spain, Valencian Community (Verloove et al. 2014 and references therein). In both cases, subtropical plants have been recorded and traced to their presumed origin in Sri Lanka or India, where coconut fibre is produced. Some of the recorded species have been already observed under natural environments (Muñoz et al. 2019), which confirms the danger of this substrate, especially when it is used for restoration purposes (Verloove et al. 2014).

Based on a series of findings during experimental trials in the University of the Balearic Islands, and during autochthonous plant production in the Centre Forestal de les Illes Balears (CEFOR), we report on two new taxa for the Bale-

aric Flora, one of them also being a novelty for the European flora. Both taxa are presumed to have arrived through contaminated batches of the coconut substrate used in both facilities. Considering the importance of plant introduction, the aim of this study is to assess for the first time in a European insular ecosystem this specific channel for plant introduction.

## Materials and methods

Plants were recorded in both CEFOR and the University of the Balearic Islands experimental facilities, and voucher specimens were collected and preserved.

Species identification and formal description was done with respect to *Dactyloctenium aegyptium* (L.) Willd. by consultation of the Online World Grass Flora - GrassBase (Clayton et al. 2006-2020). In the case of *Glinus oppositifolius* (L.) Aug. the lack of any unified work for the genera necessitated the consultation of several studies (Gagnepain 1914, Hauman 1949, Jeffrey 1961, Gonçalves 1978, Short 2002, Vincent 2003) which are provided with a synthetic key to

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**Fig. 1.** Herbarium specimen of *Dactyloctenium aegyptium* (L.) Willd. collected in experimental pots on the University of the Balearic Islands in 2020 (HerbariUIB 16860).

species identification. A formal description can be found in Flora Zambesiaca (Gonçalves 1978). Plant distribution was assessed by consulting global online species database as CABI (2020) and GBIF (2020). Names follow the accepted names in GBIF. When collected, herbarium vouchers were deposited in the Public Herbarium of the University of the Balearic Islands. Codes are indicated for each species.

## Results and discussion

*Dactyloctenium aegyptium* (L.) Willd. in Enum. pl. 2:1029. (1809).

Synonym – *Cynosurus aegyptius* L., Sp. Pl.: 72 (1753)

Specimens examined – Spain. Balearic Islands. Palma. University of the Balearic Islands, 39°38'10.4" N 2°38'31.3" E, 90 m.a.s.l. Date: 10/08/2020. Leg. et Det.: M.D. Cerrato, L. Gil & A. Ribas; Herbarium code: HerbariUIB 16860. (Fig.

1). Spain. Balearic Islands. Escorca. Menut, Centro Forestal CEFOR, 39°49'44.9" N 2°54'01.3" E, 568 m.a.s.l. Date: 10/10/2020. Obs. Pers.: C. Cardona (no herbarium voucher recorded).

Distribution in the Balearic Island – Two individuals growing in different pots of experimental plants located outdoors of the university. Individuals observed in some pots with plants for forestry purposes, and individuals growing at the margins of the CEFOR nursery.

Native range and status of naturalization – Native in Africa and Asia (Clayton et al. 2006-2020), its current distribution covers tropical and subtropical areas from Africa, Asia, Australia and America, and there are also some dispersed observations in Europe (CABI 2020, GBIF 2020). In the Mediterranean basin, it has been indicated to be expanding with records in Morocco, Italy and Cyprus (Muñoz et al. 2019). Records in Spain were indicated for the first time in Barcelona, and afterwards on several occasions in Valen-



**Fig. 2.** Herbarium specimen of *Glinus oppositifolius* (L.) Aug. DC. collected in experimental pots on the University of the Balearic Islands in 2019 (HerbariUIB 16859).

cia and Andalusia (Muñoz et al. 2019). To our knowledge this record can be considered the first evidence of the presence of *D. aegyptium* in the Balearic Islands. Based on previous comments and on observed naturalization events in CEFOR nursery, it is highly possible that future individuals will be recorded colonizing natural areas.

***Glinus oppositifolius*** (L.) Aug. DC, in Bull. Herb. Boiss., Sér. 2, 1: 552, 559 (1901).

Synonym – *Mollugo oppositifolia* L., Sp. Pl.: 89 (1753)

Specimens examined – Spain. Balearic Islands. Palma. University of the Balearic Islands, 39°38'10.4" N 2°38'31.3"E, 90 m.a.s.l. Date: 03/10/2019. Leg. et Det.: M.D. Cerrato & A. Ribas; Herbarium code: HerbariUIB 16859. (Fig. 2). Balearic Islands. Escorca. Menut, Centro Forestal CEFOR, 39°49'44.9" N 2°54'01.3"E, 568 m.a.s.l. Date: 10/09/2018. Obs. Pers.: C. Cardona (no herbarium voucher recorded).

Distribution in the Balearic Island – Two individuals growing in three different pots of experimental plants located in the outdoor premises of the university in two consecutive years. Individuals observed in some pots with plants for forestry purposes in the CEFOR nursery.

Native range and status of naturalization – *Glinus oppositifolius* covers tropical and subtropical areas, with its presence recorded as native in Central and South Africa, South and South-East Asia and North Australia and as allochthonous in New Zealand (Popay et al. 2008). In the case of the Balearic Islands and the European continent, due to the lack of any record (GBIF 2020), we consider its presence a novelty. Individuals were observed to successfully flower and produce seeds, but died during the summer, for which reason we consider the species to be of limited invasiveness.

Key to species identification for the *Glinus* genera (based on references indicated in Material and methods):



1. Pedicellate flowers ..... 2
1. Short pedicellate (< 3 mm) or sessile flowers. .... 4
2. (3)5 to 10 stamens per flower. Perianth segments 3.5 to 5 mm long. .... *G. oppositifolius*
2. More than 10 stamens per flower. Perianth segment up to 8 mm long ..... 3
3. Glabrous plants. Obovate sub-succulent leaves ..... *G. orygioides*
3. Young parts pubescent with multicellular prickly hairs. Lanceolate or oblanceolate leaves ..... *G. bainesii*
4. 2 stamens. .... *G. sessiliflorus*
4. More than 2 stamens. .... 5
5. More than 5 stamens per flower ..... 6
5. 3-5 stamens per flower. .... 7
6. 0-8 staminodes white-green. .... *G. lotoides*
6. 9-18 staminodes yellow. .... *G. setiflorus*
7. Leaves 3-5 mm length x 2-3 mm width. Leaf blade obovate obtuse, slightly attenuated towards apex.  
Petiole 0.5-1 mm. .... *G. microphyllus*
7. Bigger leaves in length (Variable in *G. radiatus*). Leaf blade obovate or elliptic to spatulate with rounded  
or acute apex. Petiole 1-7 mm. .... 8
8. Leaves nearly glabrous. .... *G. herniarioides*
8. Leaves densely pubescent ..... 9
9. Seeds smooth. Sepal apex long acuminate or attenuate ..... *G. radiatus*
9. Seeds papillate. Sepal apex rounded to slightly mucronate ..... *G. lotoides*

There is finally one taxon described as endemic to Egypt, *G. runkewitzii*. We could not access the formal description or any reference with morphological data.

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