

TWO NEW ALIEN GRASSES FROM SAND DUNES OF GHADIRA BAY IN MALTA.

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ABSTRACT

Cenchrus echinatus L., a new species for the Maltese Islands, and *Dactyloctenium aegyptium*, only recorded from the island of Gozo, has been found at the remnant sand dunes of I-Ghadira bay, a popular sandy bay located in Mellieha situated in the North of mainland Malta. Their invasive reputation and their presumed introduction routes to our islands are discussed.

Keywords: *Cenchrus echinatus*, *Dactyloctenium aegyptium*, sand dunes, coasts, alien species, invasive species, flora of Malta

INTRODUCTION

During a survey on the sand dune habitats of Ghadira, carried out by SM on the 13th October 2010 on behalf of the Malta Environment & Planning Authority, two interesting species of grasses have been observed – *Cenchrus echinatus* L. and *Dactyloctenium aegyptium*.

Cenchrus echinatus L.

Species Plantarum 2, (1753)

Cenchrus L. (Sandbur), coming from the Greek keghros – a kind of millet, is a genus of the Poaceae (Grass Family) which mostly consists of summer annual or less often perennial species of invasive reputation. They are commonly low, branching plants, with flat blades and ascending racemes with spiny deciduous fruit known as burs, each holding few spikelets. It is closely related to the genus *Pennisetum* Rich. (Fountain Grass) another genus which includes some invasive species. (Cope & Gray, 2009).



Taxonomy of *Cenchrus* L. is mostly based on the morphology of the spiny involucre and the identification of some species is problematic (CDFA, 2010) resulting in the several synonymous taxa. 25 species of *Cenchrus* are listed in WIKI (2010) and 7 varieties or forms are given for *C. echinatus* L. by IPNI (2010). AC and SM conducted their identification separately and both concluded that the specimen corresponds to *Cenchrus echinatus* L., since the following characteristic features - adapted from Cope & Gray (2009), Smith (2010) and CDFFA (2010) - were found in the studied material from Ghadira.:

- Burs excluding bristles are 5-7mm wide
- Whorls of slender bristle-like spines at the lower part of the involucre
- Fine and rather dense hairs present on the involucre and the lower parts of the upper spines
- Burs with numerous spines (40-60)
- Leaf blades relatively wide (up to 10.0-11.0 mm) having sparse pilose hairs at the base of the adaxial surface.

Figure 1: Spiny burs of *Cenchrus echinatus* L. (AC; 23 December 2009)

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Closely related species are *Cenchrus spinifex* Cav. (syn: *C. pauciflorus* L., *C. incertus* Curtis) and *Cenchrus longispinus*. (Hack.) Fernald

C. echinatus L. (Southern Sandbur, Mossman River Grass) was found in a rather degraded sandy area close to the pavement at one side and a rather dry ditch on the other which runs along the border of the Ghadira Nature Reserve (figure 2). Later, it resulted that this specimen was previously recorded by AC (managing warden of the Ghadira Nature Reserve) on the 9th December 2009. Accompanying flora were mainly ruderals, annual grasses and stands of *Arundo donax* L.

C. echinatus L. is native in Southern States of North America, Mexico and South America and widely naturalized in tropical regions around the world. Like several *Cenchrus* spp. (eg. *C. longispinus* and *C. spinifex*) it is a notorious invasive and noxious weed of warm temperate, subtropical and tropical parts of the world. (Cope & Gray, 2009; USDA 2010). It prefers well-drained sandy soils (Cope & Gray, 2009), especially along the coast which it often infests. Individual plants can produce more than 5,000 burs, with 1-3 seeds per bur (CDFA, 2010). In Australia it is a major weed if allowed to mature. The spiny burs are also a problem in recreation areas. (WAUS, 2010). Seeds are enclosed in the burs which are dispersed by clinging to woolly animals, shoes and clothing of humans, tires, farm machinery and flowing water such as in irrigation canals (CDFA, 2010; Cope & Gray, 2009).

According to GBIF (2010), no records are quoted from the North African stations, while it occurs in the following European countries: Czech Republic, France, Netherlands, Portugal (highest occurrence), Spain, Sweden, and UK. *C. echinatus* L. is not recorded in Italy but other species of *Cenchrus* are, of which *C. ciliaris* L. is the only one recorded from Sicily (Conti et al, 2005). *C. echinatus* L. was introduced in UK with wool, birdseed and soya bean waste (Cope & Gray, 2009). We could think of only two possible methods of introduction, either through tourism (several thousands of tourists visits Ghadira Bay every year) or by migratory birds visiting the Ghadira Nature Reserve. The former means is the more likely route given that the specimen was found 2 metres away from the pavement, instead in the central parts of the Nature Reserve. Burs easily attach to cloths, towels, shoes or bags of tourists coming from such countries where *C. echinatus* L. also occurs in sandy bays - one of its common habitats. Nevertheless, burs adhering to and transported by large birds visiting the Ghadira Nature Reserve cannot be completely excluded. AC proved that the burs can adhere to the feathers of birds at the Nature Reserve, though these are likely to drop during the long migration flight. The fact that the species is not recorded from Italy and North Africa (GBIF) suggests that seed dispersal by migratory birds is unlikely. Moreover, while it is reported that the burs can be dispersed by woolly animals. (Cope & Gray, 2009; CDFA, 2010), birds are not specified as dispersal vectors of this species.

***Dactyloctenium aegyptium* (L.) P. Beauv.**

Ref: Agrost. 72, Expl. Pl. 10 (1812)

Dactyloctenium aegyptium (L.) P. Beauv. (syn = *Cynosurus aegypticus* L.), known as the Egyptian crowfoot grass or the beach wiregrass, was first recorded in the Maltese islands from a garigue habitat along the valley side of Xlendi, in the island of Gozo by SM. (Mifsud, 2008). On the 13th October 2010, SM identified 5 specimens of Egyptian crowfoot grass on disturbed and possibly remnant sand dune intermixed with soil present on the rocky coastal area of Ghadira Bay (Figure 3). Accompanying flora were mainly ruderals like *Cynodon dactylon* L., *Setaria adhaerens* (Forsskål) Chiovenda, *Malva* L. and *Lavatera* L. spp., *Reichardia picroides* (L.) Roth, grasses and other casual annuals.

According to Smith (2010), the species is native to Africa and distributed worldwide. It is known from warm tropical and sub-tropical regions of Africa and Asia (Tutin *et al.*, 1980 ; Pignatti, 1982; Holm *et al.*, 1977), where it occurs in at least 52 countries of this region (GRIN, 2010), including North Africa (Morocco, Algeria, Tunisia, Libya and Egypt). The latter territory is probably the source of origin in South Europe, were according to Tutin *et al.*, (1980) it is only found naturalised in Crete and Italy (Latium, Molise, Calabria, Sicily and Turin – Pignatti, 1982; Conti *et al.* 2005).

D. aegyptium (L.) P. Beauv is probably introduced in the Maltese islands through migrating birds since the species is reported to be found in the North African region (GRIN, 2010), and some birds (for example the helmeted guinea-fowl in Kenya) have been found to consume parts of this plant (Swank, 1977). However, no documented study was found to demonstrate that migratory birds from Africa had parts of this grass in their digestive tract.

The disturbed sandy soil habitat where the specimens were found in Ghadira Bay was different from that of the population of Xlendi where there, it was found in damp or wet soil in shallow rock basins (Mifsud, 2008) However, the plant is described to grow in different habitats and shows wide environmental adaptability. Habitats described for *D. aegyptium* include sand dunes, uncultivated and disturbed habitats near the coast, (Pignatti 1982, Holm *et al.*, 1977), arable land near the sea (Holm *et al.*, 1977) and sandy soils (Holm *et al.*, 1977). It is also reported as a weed

in many countries in the humid tropics (Holm *et al.*, 1977). FAO (2010) declares that this species is tolerant of alkaline soils, resistant to drought, adapted to a wide range of soil texture and is a quick-growing, short-term grazing plant which colonizes disturbed land. Although described as an invasive species for many countries (Holm *et al.*, 1977), it seems that *D. aegyptium* is not a successful invader for the Maltese islands, even if it could be too early to confirm such statement.

Illustrations



Figure2: *Cenchrus echinatus* L. from Ghadira Bay, Mellieħa, Malta. (SM; 15 October 2010)



Figure3: *Dactyloctenium aegyptium* (L.) P. Beauv. from Ghadira Bay, Mellieħa, Malta (SM; 15 October 2010)

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GRIN - United States Dept. of Agriculture, Germplasm Resources Information Network website. National Germplasm Resources Laboratory, Beltsville, Maryland. (Last accessed on October 2010)
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