

An unexpected increase in the known populations of the steno-endemic *Galium litorale* Guss. (Rubiaceae) in south-western Sicily

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ABSTRACT

Following our recent discovery of approximately 250 populations of the Sicilian steno-endemic *Galium litorale* Guss. (Rubiaceae) in the area of Mazara del Vallo (Trapani, Sicily, Italy), further targeted field surveys carried out between April and May 2026 have led to the identification of five previously unknown populations in the localities of La Sciumara, Roccolino Soprano, La Muntagna, Dattilo, and Bucàri. These new findings add a total of 94 population nuclei, expanding the known distribution range of this near-threatened species. Overall, the total number of known populations of *G. litorale* in south-western Sicily increases from approximately 250 to 344. Notably, this study reports for the first time the occurrence of *G. litorale* under previously unreported nurse species, including *Quercus ilex*, *Rhamnus oleoides* subsp. *oleoides*, *Olea europaea* var. *sylvestris*, *Cytisus* cf. *infestus*, and *Foeniculum vulgare*, providing new insights into the species' ecological requirements. While these discoveries are encouraging for the conservation of the species, they underscore the urgent need for active habitat protection measures, as all newly discovered sites are currently unprotected and vulnerable to fires, grazing, and land abandonment.

KEY WORDS

Galium litorale; Sicily; new populations; nurse plants; ecological associations; distribution update; conservation; steno-endemic.

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INTRODUCTION

Galium litorale Guss. (Rubiaceae) is a steno-endemic species of south-western Sicily (Italy), with a natural range historically confined to a system of calcareous outcrops along the coastal stretches of the province of Trapani, between Marsala and Selinunte (Abeli, 2011; Ditta & Surdo, 2025). This species is typically associated with the remaining patches of garigue and maquis, which have become increasingly rare due to agriculture,

urbanization, and recurrent fires (Ditta & Surdo, 2025).

Recently, Ditta & Surdo (2025) significantly updated the knowledge on the distribution of *G. litorale* by discovering approximately 250 new populations in the area surrounding Mazara del Vallo, particularly in the Roccazzo archaeological area and adjacent hills (Montagna della Meta, Torre and Baglio Grimesi, Santa Teresa, Deccaco, Torrente Granatelli, and La Guletta). Despite this substantial increase, the overall distribution range of the

species remained incompletely known, as several neighboring areas with similar ecological characteristics had not yet been systematically surveyed.

The main objectives of the present study are:

(1) to report new populations of *G. litorale* discovered in the localities of La Sciumara, Roccolino Soprano, La Muntagna, Dattilo, and Bucàri;

(2) to provide updated data on population size, area occupied, and habitat characteristics;

(3) to document for the first time novel associations with nurse species that were not previously reported for *G. litorale*;

(4) to discuss the implications of these findings for the conservation of this near-threatened endemic.

MATERIAL AND METHODS

Following the methodology described in Ditta & Surdo (2025), field surveys were conducted in the area surrounding Mazara del Vallo (Trapani, Sicily, Italy) between April and May 2026. A preliminary survey was carried out on 24 April 2026 at the La Sciumara locality, followed by a more extensive survey on 7 May 2026. Further surveys were conducted on 12 May 2026 (Roccolino Soprano), 13 May 2026 (La Muntagna), 20 May 2026 (Dattilo), and 21 May 2026 (Bucàri) (Fig. 1, Table 1).

All collection data were recorded, including the number of distinct population nuclei, the area occupied, the presence of plants associated with *G. litorale*, and the nurse species under which the populations were found. Voucher specimens (Fig. 2) were collected and deposited at the Herbarium of the University of Florence.

RESULTS

The surveys carried out between April and May 2026 revealed the presence of five previously unknown localities of *G. litorale*: La Sciumara (Fig. 3), Bucàri (Figs. 4, 5), Roccolino Soprano, La Muntagna (Fig. 6) and Dattilo. Specifically, 94 distinct population nuclei were censused (Table 1).

With these new records, the total number of known populations of *G. litorale* in south-western Sicily increases from approximately 250 to approximately 344.

Population distribution and size

The largest new population of *Galium litorale* was found at La Muntagna, with 42 nuclei distributed over 9.8 hectares at approximately 60 m a.s.l. The La Sciumara locality hosted 22 nuclei over 0.25 ha at 90 m a.s.l. along the Mazaro River, while Bucàri yielded 21 nuclei over 0.5 ha at 100 m a.s.l.

Locality	Survey date	Coordinates (N, E)	Area (ha)	Altitude (m a.s.l.)	N° populations	Notes
La Sciumara	24.IV.2026 (prelim.) / 7.V.2026 (full)	37°42'23.38", 12°37'24.28"	0.25	90	22	Along Mazaro River
Roccolino Soprano	12.V.2026	37°43'8.63", 12°42'15.43"	1.4	85	8	
La Muntagna	13.V.2026	37°41'50.50", 12°39'14.80"	9.8	~60	42	
Dattilo	20.V.2026	37°43'39.04", 12°37'44.18"	1.2	110	1	Vast area explored
Bucàri	21.V.2026	37.731834, 12.663174	0.5	100	21	Base of a hill; summit not explored

Table 1. Summary of the newly discovered populations of *Galium litorale* in south-western Sicily.

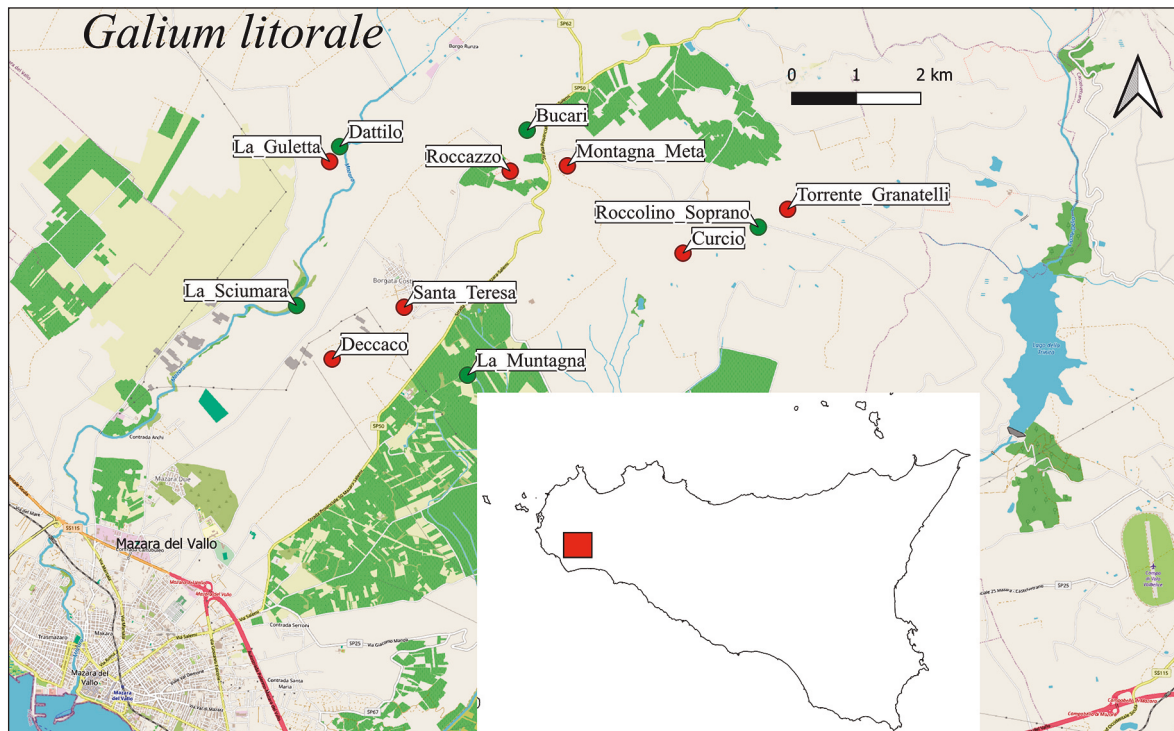


Figure 1. Updated distribution map of *Galium litorale* in south-western Sicily (Italy). Red circles represent populations previously recorded by Ditta & Surdo (2025); green circle indicate the newly discovered populations (this study).



Figure 2. Samples of *Galium litorale* plants found in the Bucari locality (Mazara del Vallo, Sicily, Italy), 21 May 2026. Photo by A. Ditta.

at the base of a hill. Roccolino Soprano had 8 nuclei over 1.4 ha at 85 m a.s.l. A single isolated nucleus was found at Dattilo at 110 m a.s.l. over 1.2 ha.

Nurse plants and novel associations

As in previous observations (Ditta & Surdo, 2025), the plants of *G. litorale* were predominantly found under the protective cover of *Ampelodesmos mauritanicus* (Poir.) T. Durand & Schinz (36 populations) and *Chamaerops humilis* L. (41 populations). However, the present study reports for the first time new associations with several tree and shrub species that were not previously documented as nurse plants for *G. litorale* (Table 2).

Quercus ilex L. (1 population at La Sciumara)

Rhamnus oleoides L. subsp. *oleoides* (1 population at La Sciumara)

Olea europaea L. var. *sylvestris* (Mill.) Lehr (2 populations at La Muntagna)

Cytisus cf. *infestus* (C. Presl) Guss. (3 populations at La Muntagna)

Foeniculum vulgare Mill. (2 populations at Bucàri)

Asphodelus ramosus L. (1 population at La Sciumara).

These findings suggest that the ecological plasticity of *G. litorale* may be broader than previously assumed, and that other tree and shrub species can act as effective nurse plants, providing shade and protection from desiccation.

DISCUSSION AND CONCLUSIONS

The discovery of these new populations of *G. litorale* significantly increases our knowledge of the distribution and population size of this steno-endemic species in the south-western Sicily. The total number of known populations now stands at approximately 344, representing a substantial increase of nearly 38% compared to the previous census (Ditta & Surdo, 2025).

The most significant finding of this study is the documentation of new nurse species associations. This broader range of associated species suggests that *G. litorale* may be more ecologically adaptable than previously thought, potentially colonizing a wider variety of microhabitats where adequate shelter from desiccation is provided.

Despite these encouraging findings, several critical points must be emphasized:

1. Habitat vulnerability. All newly discovered sites are currently unprotected and lack any form of

Locality	<i>Chamaerops humilis</i>	<i>Ampelodesmos mauritanicus</i>	<i>Quercus ilex</i>	<i>Rhamnus oleoides</i>	<i>Olea europaea</i> var. <i>sylvestris</i>	<i>Cytisus</i> cf. <i>infestus</i>	<i>Foeniculum vulgare</i>	<i>Asphodelus ramosus</i>	Not associated	Total
La Sciumara	10	7	1	1	0	0	0	1	2	22
Roccolino Soprano	6	1	0	0	0	0	0	0	1	8
La Muntagna	25	8	0	0	2	3	0	0	4	42
Dattilo	0	1	0	0	0	0	0	0	0	1
Bucàri	0	19	0	0	0	0	2	0	0	21
Total	41	36	1	1	2	3	2	1	7	94

Table 2. Nurse species associated with the newly discovered populations of *Galium litorale*.



Figure 3. *Galium litorale* plants from La Sciumara (Mazara del Vallo, Sicily, Italy), 7 May 2026. Photo by A. Ditta.

legal conservation status. As noted in the field observations, none of these localities can be considered a true “sciara” as their geological and botanical characteristics do not correspond to this habitat type. This underscores the uniqueness and vulnerability of these habitats. The term “sciara” refers to a formation typical of this part of Sicily, characterized by low Mediterranean scrub or garrigue growing on calcareous soil or rocky outcrops. An example is the “Sciare di Marsala” a protected natural area and a Site of Community Importance (SCI/SAC) within the Natura 2000 network in Sicily (see also Sparacio & Surdo, 2021).

2. Threats. The main threats identified in the study area include:

- recurrent fires; the area is highly prone to summer fires, which can rapidly destroy entire populations;
- grazing; the presence of domestic and wild herbivores can damage or eliminate plants;
- land abandonment and illegal dumping, as observed in the Roccazzo area (Ditta & Surdo, 2025), some sites are subject to abandonment and accumulation of waste.



Figure 4. *Galium litorale* plants from Bucàri (Mazara del Vallo Sicily, Italy), 21 May 2026. Photo by A. Ditta



Figure 5. La Muntagna near Mazara del Vallo (Sicily, Italy), 7 May 2026. Photo by A. Ditta.



Figure 6. Bucàri near Mazara del Vallo (Sicily, Italy), 21 May 2026. Photo by A. Ditta.

3. Need for active protection: we strongly recommend:

- the establishment of protected areas or inclusion of these sites in existing conservation networks;
- implementation of fire prevention measures (e.g., creation of firebreaks, periodic clearing of flammable vegetation);
- restriction of access and prohibition of grazing where necessary;
- regular monitoring of population dynamics;
- further exploration of steep or difficult-to-access areas that may harbor additional populations.

In conclusion, the discovery of these new populations with the novel ecological associations, provides a glimmer of hope for the conservation of *G. litorale*. However, due to all the ecological and biological characteristics of these populations, active and targeted conservation actions are urgently needed to safeguard this precious element of Sicily's natural heritage.

Furthermore, further studies are needed to complete the survey of other potentially suitable areas, conduct genetic analyses to assess connectivity among populations and evaluate their long-term viability, and develop a comprehensive conservation strategy based on the updated distribution map provided in this study.

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