taxonomy

MDPI

Article

Notes on the *Vicia tenuifolia* Complex with the Description of a New Species, *V. barbatoi* from Sicily

Salvatore Cambria [1], Veronica Ranno [1,*], Pietro Minissale [1], Gianpietro Giusso del Galdo [1], Cristina Salmeri [2], Danilo Monari [1], Alfonso La Rosa [2], Giuseppe Siracusa [1] and Filippo Scafidi [2]

[1] Department of Biological, Geological and Environmental Sciences, Catania University, Via A. Longo 19, 95125 Catania, Italy; cambria_salvatore@yahoo.it (S.C.); p.minissale@unict.it (P.M.); g.giusso@unict.it (G.G.d.G.); danilomonari.2001@gmail.com (D.M.); giuseppe.siracusa@unict.it (G.S.)

[2] Department of Biological, Chemical and Pharmaceutical Sciences and Technologies (STEBICEF), Palermo University, Via Archirafi 38, 90123 Palermo, Italy; cristinamaria.salmeri@unipa.it (C.S.); alfonso.larosa@unipa.it (A.L.R.); filippo.scafidi@unipa.it (F.S.)

* Correspondence: veronica.ranno@phd.unict.it

Abstract

A new species from western Sicily (Italy), *Vicia barbatoi*, is described and illustrated in this paper. This taxon belongs to the wide *V. cracca* L. group, specifically within the *V. tenuifolia* complex. It is related to *V. elegans*, which is generally treated as an endemic species of the central–southern Italian peninsula and Sicily, whose distribution and taxonomic position are discussed. The morphological features of *V. barbatoi* are analyzed, and its more relevant characters are highlighted in comparison with the most closely related taxa through morphometric and statistical analyses. Besides seed micromorphology, karyology (2n = 12), ecology, distribution, and the conservation status of the new species are examined.

Keywords: Mediterranean flora; endemism; Fabaceae; phytosociology; ecology

check for updates

Academic Editor: Dmitry D. Sokoloff

Received: 23 September 2025
Revised: 23 October 2025
Accepted: 28 October 2025
Published: 3 November 2025

Citation: Cambria, S.; Ranno, V.; Minissale, P.; Giusso del Galdo, G.; Salmeri, C.; Monari, D.; La Rosa, A.; Siracusa, G.; Scafidi, F. Notes on the *Vicia tenuifolia* Complex with the Description of a New Species, *V. barbatoi* from Sicily. *Taxonomy* **2025**, *5*, 63. https://doi.org/10.3390/taxonomy5040063

Copyright: © 2025 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (https://creativecommons.org/licenses/by/4.0/).

1. Introduction

The genus *Vicia* L. (Fabaceae) includes approximately 248 species [1] distributed throughout the temperate zone of the northern hemisphere and in non-tropical South America [2]. According to Hanelt & Mettin [3], *Vicia* subgenus *Cracca* is the most diverse, containing about 140–160 species. The distribution of the subgenus encompasses nearly the entire range of the genus. Overall, this subgenus includes very heterogeneous species, and it is difficult to identify shared morphological characters. However, most of the species are perennials, generally climbing plants with paripinnate leaves, and tendrils and the subgenus appears to be monophyletic, as noted by Leht [4]. This author also highlighted, with cladistic analysis, the rather isolated position of *V. tenuifolia* Roth with respect to the other species of the subgenus (except for *V. cracca* L.). This taxon, widely distributed in the temperate regions of Eurasia and NW Africa [1,5], shows remarkable variability in both vegetative and reproductive morphological traits. This morphological diversity has been interpreted in different ways—either at the intraspecific level (as varieties or subspecies) [6–9] or at the species level [10–13]. In Italy, three taxa within the *V. tenuifolia* complex are recognized by the most recent national flora and checklist [8,12]: *V. tenuifolia* (= *V. tenuifolia* subsp. *tenuifolia*), *V. elegans* Guss. (= *V. tenuifolia* Roth subsp. *elegans* (Guss.) Nyman) and *V. dalmatica* A. Kern. (= *V. tenuifolia* Roth subsp. *stenophylla* Velen., *V. tenuifolia* Roth subsp. *dalmatica* (A. Kern.) Greuter).

Vicia tenuifolia is widespread in almost all the regions of the country, except for Veneto, Emilia Romagna, Calabria, Sardinia and Sicily. In this last region the species was mentioned only once by Lopriore [14] for the surroundings of Catania, but this single record is vague and unsupported by any herbarium specimens, and the species has never been observed again on the island, thus it was likely the result of misidentification with *V. elegans* or *V. incana* Gouan.

V. elegans is an endemic species found exclusively in the central and southern regions of the peninsula and in Sicily. It was originally described by Gussone [10] for northeastern Sicily, specifically for the southern slopes of the Nebrodi Mountains. This species is distinct from *V. tenuifolia* due to its narrower leaflets, bushy growth habit, inflorescence with nearly simultaneous flowering, outward-facing flowers, and several additional diagnostic features.

The native status of *V. dalmatica* has long been debated. Its presence in Italy has been confirmed only in few localities of Liguria, Veneto, Marche, Latium and Apulia [15–17]. This species has a range centered mainly in southeastern Europe from the Balkans and Greece to Turkey and the Middle East, as well as south to Crete and Cyprus [5,18–23], while it is an alien in France, Belgium, Germany and the Czech Republic [1,13,24,25].

Given the uncertainty regarding the most suitable morphological traits for distinguishing these species, this study analyzes in detail the taxonomic relationships within the *V. tenuifolia* group in Italy. Furthermore, an isolated population of *Vicia elegans* occurring on the Palermo Mountains (western Sicily) was carefully examined in order to identify its morphological relationships with the other species of the group. In fact, this population, discovered by Romano et al. [26] in 1994 and previously identified as *V. elegans*, exhibits notable morphological differences from other populations of the species found in the typical localities of northeastern Sicily, as also emphasized by the aforementioned authors. Based on our morphological and taxonomic study, supported by statistical analyses, this population is recognized as a new species.

2. Materials and Methods

2.1. Study Area

The analyzed population was found in a mountain locality known as "Portella della Ginestra", near Piana degli Albanesi (Palermo, western Sicily, Italy). This place, at an altitude of ca. 850–950 m, is surrounded by some of the highest calcareous peaks of Palermo Mountains, such as Mt. Kumeta, and Mt. Pizzuta. The vegetation of this area is characterized mainly by large surfaces covered by dry grasslands with *Ampelodesmos mauritanicus* (Poir.) T. Durand & Schinz, degraded scrubland, and some cultivated areas (cereal fields and vineyards) and is strongly affected by human disturbance, including fires, cutting and grazing. The potential vegetation was represented by mesophilous oak woods dominated by species belonging to *Quercus pubescens* Willd. groups (mainly *Q. virgiliana* (Ten.) Ten.) on flat surfaces with deeper clayey soils, while the steeper slopes with rocky outcrops were covered by *Q. ilex* L. woodlands [27,28]. In particular, the most characteristic forest communities of this area are represented by the *Oleo oleaster-Quercetum virgilianae* Brullo 1984, linked to basic clay soils and the *Ampelodesmo mauritanici-Quercetum ilicis* Gianguzzi, Cuttonaro, Cusimano & Romano 2016 on the steepest slopes.

According to the bioclimatic classification of Sicily [29], the site falls within the Mesomediterranean belt with humid ombrotype.

2.2. Morphometric Analysis

The morphological study was conducted on ten individuals of the investigated population, sampled from Portella della Ginestra (Piana degli Albanesi). For *Vicia elegans* as

well, 10 specimens were used, collected in Capizzi (Northeastern Sicily), one of the species' classic localities. All measurements were taken on fresh material.

In agreement with other morphological studies on the genus *Vicia* [4–6,13,15], the following morphological traits were examined:

- Plant height (cm);
- Growth habit (climbing or shrubby);
- Total leaf length (mm);
- Length and width of leaflet (mm);
- Leaf indumentum;
- Number of leaflets;
- Tendril length (mm);
- Stipule shape and length (mm);
- Internode length (mm);
- Number of flowers per inflorescence;
- Inflorescence length (mm);
- Flowering period;
- Flower arrangement (unilateral or bilateral);
- Calyx tube length (mm);
- Calyx indumentum;
- Number of calyx teeth;
- Length of major and minor teeth (mm);
- Corolla length (mm);
- Flower peduncle length (mm);
- Standard petal length, tube length and width (mm);
- Standard petal blade length and width (mm);
- Standard petal color and venation;
- Wing petal length and width (mm), and color;
- Keel dimensions (mm) and color;
- Staminal tube length (mm);
- Legume size (mm) (up to 23 specimens);
- Number of seeds per legume;
- Beak length of the legume (mm);
- Seed size.

All measurements were taken using carbon fiber composite digital calipers (Qfun, China), a digital precision tool employed for assessing fruits, leaves, petals, sepals, styles and stamens.

Further analyses were conducted on seed micromorphology to investigate potential differences in seed coat sculpturing. These observations were performed using Scanning Electron Microscopy (SEM). Seeds were mounted on aluminum stubs with double-sided adhesive tape, gold-coated, and examined using a Zeiss EVO LS 10 scanning electron microscope (Carl Zeiss, Oberkochen, Germany) available at the Section of Plant Biology, Botanical Garden of Catania (Department of Biological, Geological and Environmental Sciences, University of Catania, Italy).

2.3. Statistical Analysis

To assess the normality of the variables, the Shapiro–Wilk test was applied to each morphometric trait within the two populations (Portella della Ginestra plants and *V. elegans*). Only variables showing a normal distribution ($p > 0.05$) in both species were retained for subsequent parametric analysis.

Morphological differences between *V. barbatoi* and *V. elegans* were assessed using independent-samples *t*-tests for normally distributed variables and Mann–Whitney U tests for variables that did not meet the assumption of normality (Shapiro–Wilk test, $p < 0.05$). Given the comparison involved only two species, the *t*-test was the most appropriate method, while ANOVA and Tukey's tests were also performed as a consistency check, yielding identical results.

The *p*-values resulting from *t*-tests were visualized using a heatmap to highlight the magnitude and significance of interspecific differences across the measured traits. The normally distributed variables included the following:

- Plant height.
- Total leaf length.
- Internode length.
- Number of flowers per inflorescence.
- Inflorescence length.

Non-parametric comparisons (Mann–Whitney U test) were applied to:

- Number of calyx teeth.
- Number of leaflets.
- Number of seeds per pod.

In parallel, a Principal Component Analysis (PCA) was carried out on eight quanttative traits consistently measured across all individuals:

- Plant height.
- Total leaf length.
- Number of leaflets.
- Internode length.
- Number of flowers per inflorescence.
- Inflorescence length.
- Number of calyx teeth.
- Number of seeds per legume.

Variables were standardized (mean = 0, standard deviation = 1) prior to the analysis. The PCA was used to summarize overall morphological variation and highlight the traits most relevant for species separation.

Given the small sample size (only 10 individuals per species), the results of statistical tests should be interpreted with caution, as the limited number of observations reduces the power of normality assessments and parametric comparisons.

Moreover, a Principal Component Analysis (PCA) was carried out on all the species belonging to *V. tenuifolia* using 7 quantitative traits measured on twenty individuals of each species (except for Portella della Ginestra population, for which only 10 specimens were considered):

- Number of leaflets;
- Leaflet width;
- Number of flowers per inflorescence;
- Inflorescence length;
- Corolla length;
- Keel length;
- Number of seeds per legume.

All statistical analyses were performed using R software (version 4.x, R Core Team, Wien, Austria) [30]. The following R packages were employed to conduct and visualize the analyses: "readxl" for data import, "dplyr" and "tidyr" for data manipulation, "rstatix" for statistical testing and "ggplot2" for data visualization.

2.4. Herbarium Investigations

Herbarium specimens of *V. tenuifolia*, *V. dalmatica* and *V. elegans*, from B, BR, CAT, E, FI, GJO, H, MACB, MHA, NAP, P, PAL, PESA, PRC, RO, WU, ZAG, ZT (herbarium acronyms according to Thiers [31]) were also examined for taxonomic comparison; some of them were consulted online. The materials were observed under a Zeiss Stemi SV 11 Apo stereomicroscope at 6–66 × magnification (Microscope Marketplace, Sanford, NC, USA). Comparative diagnostic features of the investigated taxa are listed in Table 1.

Table 1. Comparison of the main morphological characters of the species belonging to the Vicia tenuifolia group in Italy, based on investigations carried out on the analyzed specimens cited in the Specimina visa. The extreme values enclosed in brackets indicate measurements found only exceptionally.

	V. barbatoi	***V. elegans***	***V. tenuifolia***	***V. dalmatica***
Plant height (cm)	100−140	30−100	50−100	30−100
Habit	bushy	bushy	weak climber	bushy
Leaf length (cm)	3.5−8.5	6.1–10.6	4−15	4−10
Leaflets size (mm)	11–22 × 0.5–1.5	13–28 × 1.5–3.5	15–40 × 2–5	10−20 × 0.5−1.5(2)
Leaflets number	12−17	14−20(22)	16−30	10−18
Inflorescence number of flowers	5−11(14)	11−25	15−36(50)	8−18
Inflorescence length (mm)	(120)150−270	82−150(185)	100−300(500)	80−180
Flowering	almost progressive	almost simultaneous	progressive	simultaneous
Inflorescence shape	bilateral	almost unilateral	almost unilateral	almost unilateral
Inflorescence consistency	very lax	dense	dense	lax
Flower position	patent	patent	nodding	patent
Calyx tube length (mm)	1.8−2.8	2.8−4	2−4	1.5−2.5
Corolla length (mm)	7.6−13	13−17	13−18	13−20
Standard length (mm)	7.2−13	13−18	13−17	10−18
Standard limb length (mm)	4.4−9	8−11	9−16	10−12
Standard colour	pinkish and later blue	lilac−pink and then purple	blue−purple	reddish−blue
Wings length (mm)	7−11.9	12−16	8.5−15.5	10−12
Wings colour	lilac−whitish	lilac−purple	lilac−whitish	lilac−pinkish
Keel length (mm)	6.6−10	9−11	6−10	7−9
Pod length (mm)	18.6–25(28)	(23)25–37	20−35	15−30
Seed number for pod	1−2	3−6	3−6	3−6
Seeds size (mm)	3.5−5	4−5	2.5−3.5	3−4

2.5. Specimens Examined of Vicia elegans

ITALY. Sicily. Favoscuro (Nebrodi), 4 June 2019, S. Cambria s.n. (CAT!); Sicily. Capizzi (Nebrodi), 1200 m, 37°52′34.01″ N 14°29′55.22″ E, 12 June 2025, S. Cambria s.n. (CAT!); Sicily. Capizzi (Nebrodi), 1200 m, 05 July 2025, S. Cambria s.n. (CAT!); Sicily. Milo (Etna), May 1888, Tornabene (CAT006431!); Sicily. Cerreta di Capizzi, 04 July 1983, S. Brullo s.n. (CAT034629!); Sicily. Troina, 05 July 1983, S. Brullo s.n. (CAT034630!); Sicily. Ad piedes montium Madoniarum prope Polizzi, 6–900 m, 6 Julio 1874, P. Gabrieli s.n. (FI076638!); Sicilia, s.d., Gussone s.n. (NAP0005205!; NAP0005206!); Sicilia, s.d., G. Gussone s.n. (RO!).

2.6. Specimens Examined of Vicia tenuifolia

HUNGARY, Borsod-Abaúj-Zemplén, Ungarisches Mittelgebirge, Bükk Gemeinde Tard, 150 m, 47°53′54″ N 20°35′14″ E, 28 May 2023, K. Zernig 14306 (GJO0125225!); CZECH

REPUBLIC, Labské středohoří, České středohoří, Velké Žernoseky (distr. Litoměřice), 191 m, 50°32′23.5″ N 14°04′05.6″ E, 30 May 2023, J. Prančl s.n. (PRC472681!); AUSTRIA, Steiermark, Voitsberg, Maria Lankowitz. Stubalpe, Altes Almhaus, 1630 m, 42°05′00″ N 14°55′34″ E, 16 August 2022, R. Chizzola s.n. (WU0155347!); FINLAND, Åland Islands, Finström, 10 Jun. 2014, H. Kämäräinen s.n. (H832231!); GREECE, Chalkidiki, SW Paleokastro, 525 m, 40°25′51″ N 23°24′59″ E, 19 May 2019, E. Willing & R. Willing s.n. (B 10 1079122!); Korinthia, WSW Evrostina, 1139 m, 38°02′52″ N 22°23′04″ E, 2 May 2018, E. Willing & R. Willing 285591 (B 10 1057262!); BELGIUM, Baudour, canal Nimy-Blaton, canal bank, 20 May 2012, F. Verloove s.n. (BR0000024487429!); RUSSIAN FEDERATION, Kalmykia, Yashaltinskii raion, 46°31′18.8″ N 42°4′32.4″ E, 14 May 2012, N. Stepanova s.n. (MHA0183376!); SPAIN, Community of Madrid, La Hiruela, high Jarama valley, Porrejon, 1500 m, 11 Jul, 1992, A. E. de Salamanca s.n. (MACB122254!); SWITZERLAND, Valais canton, Martigny-Combe, 850 m, 46°5′29.57″ N 7°2′49.61″ E, P. Farquet s.n. (ZT00204317!); SYRIA, 25 April 1936, Luis brothers s.n. (P03032264); ITALY, Vicovaro (Lazio), 23 June 1987, B. Anzalone s.n. (RO-HA25532!); Laghetti di Percile (Lazio), 2 June 1986, B. Anzalone s.n. (RO-HA25534!); Gruppo del M. Tolagna: pendici sassose e luoghi erboso-sassosi a Collattoni, 4 June 1986, A. Brilli-Cattarini & L. Gubellini s.n. (PESA!); ALBANIA, mountains above Gyrokaster, 9 May 2018, S. Cambria s.n. (CAT!).

2.7. Specimens Examined of Vicia dalmatica

BULGARIA, Oblast Blagoewgrad; Westliche Rhodopen Gemeinde Satovča, 1240 m, 24°02′06″ N 41°38′18″ E, 13 July 2022, K. Zernig 13758 (GJO 0119201!); Rila Mts., Cesna (river) valley, 3–4 km N of Jakoruda, Quercus wood on the W-facing side of the valley, SW of Rajna mogila, 1100–1200 m, 23 July 1980, P. Frost-Olsen 3406 (P00898005!); AUSTRIA, Niederösterreich. Knapp NE Stronegg., 269 m, 48°38′9.9″ N 16°18′59.8″ E, 26 May 2017, C. Gilli s.n. (WU0123416!); TURKEY, Mersin province, Mut, Mağras Dağ, limestone slopes and cliffs, 1300 m, 11 May 1965, M.J.E. Coode & B.M.G. Jones 799 (E00366671!); 40 km north of Zara (Zara 71 km east of Sivas), bushland beyond the pass, 1900 m, 26 June 1969, J.S. Andersen & I.C. Petersen 11 (E00366641!); Hatay, Amanus Mountains, hills above Belen to S of road, clay-shale area of pines and maquis, 600 m, 15 April 1966, Cheese & Watson 758 (E00366628!); ARMENIA, near Saravan. At 91/49km sign on Azizbeklv to Sisian road, 1540 m, 39°43′ N 45°39′ E, 20 June 1989, Maxted, Bisby, Forde, Golubev, Munyenyembe & Yurchikov 6825 (E00366660!); ROMANIA, Babadag (Dobrogea), near Steraru, between Ceamurlia de Sus and Alexandria, 200 m, 3 June 1986, F. Černoch 45766 (BR0000025304473V!); CROATIA, in cultivated areas near Spalato, A. Kerner, (H1290125!); Dalmaciya, Otoke Korcula, 7 June 1962, I. Trinajistic s.n. (ZAG33601766!); near Spalato, 20 May 2019, S. Cambria (CAT!); CYPRUS, Stavros, Paphos Forest, May 1932, A. Foggie 64 (E00366616!); ITALY, Sirolo (Ancona), M. Conero, basse pendici meridionali, luoghi incolti, 250 m, 26 June 2001, S. Pesaresi & M. Baldoni s.n. (FI!); Laghetti di Percile e adiacenze (Lazio), 6 June 1981, B. Anzalone & E. Lattanzi s.n. (RO-HA!).

2.8. Phytosociological Study and Conservation Assessment

Phytosociological investigations were carried out using the method of the Sigmatist school [32], while for the syntaxonomical arrangement, Mucina et al. [33] was followed. The nomenclature of the species has been updated according to the checklists of the native Italian vascular flora [8]. The conservation status of the species was calculated with GeoCAT (Geospatial Conservation Assessment Tool) software [34], and according to IUCN guidelines [35].

3. Results

Taxonomic treatment

(A) *Vicia barbatoi* Scafidi, Ranno & Cambria sp. nov. Figures 1, 2, 3A and 4

Diagnosis: *V. barbatoi* is similar to *V. elegans* in having paripinnate leaves ending in branched tendril, with narrow leaflets, entire or semi-hastate stipules, inflorescences longer than leaves, calyx with 4–6 acute teeth, corolla shorter than 18mm and oblong–ellipsoid pod. However, it differs in having leaflets 0.5–1.5 mm wide (vs. 1.5–3.5 mm), a sparser and more lax inflorescence, up to 270 mm long (vs. up to 185 mm), generally bilateral and with scalar flowering from bottom to top, flower with smaller corolla, 7.6–13 mm long (vs. 13–17), lilac–whitish wings (vs. lilac–purple) and shorter legumes with 1–2 seeds (vs. 3–6).

Holotype

ITALY. Sicily. Piana degli Albanesi (Palermo), Portella della Ginestra, 37°58′29″ N 13°15′12″ E, 884 m s.l.m., 13 June 2024, F. Scafidi s.n. (PAL Holotype). Isotypes: CAT, PAL.

Other specimens examined of *Vicia barbatoi* (Paratypes)

ITALY. Sicily. Portella della Ginestra (Piana degli Albanesi), 880 m, 37°58′29.68″ N 13°15′12.02″ E, 6 June 2025, S. Cambria & F. Scafidi s.n. (CAT **Paratypes**).

Description

Perennial herb, with many annual stems arising from a basal rootstock, densely twisted, up to 1–1.4 m high. Stems with a dense and apparent dichotomous branching, covered with appressed hairs. Internodes 2.3–7.3 cm long, generally shorter in upper part. Stipules entire or semi-hastate, foliaceous, glabrous, margin smooth, not toothed, 5–12.4 mm long. Leaves sparsely hairy, glaucous, paripinnate, 3.5–8.5 cm long (excluding the tendril), with 12–17 leaflets, provided with a terminal twining tendril, 4.5–14 mm long, often 2-branched, hairy; leaflets 11–22 × 0.5–1.5 mm, lanceolate, shortly attenuate at the base, acute and mucronulate at the apex, subsessile or shortly petiolate (to ca. 1mm long). Inflorescence a raceme 5–11(14)-flowered, very lax, much longer than the leaves, with a long almost bare stalk, (120)150–270 mm long, sparsely hairy, generally bilateral and often with scalar flowering from bottom to top. Flowers 7.6–13 mm long, with pedicel 0.8–1.8 mm long. Calyx glabrous or slightly hairy, campanulate, green tinged with red, 5–veined, with tube 1.8–2.8 mm long, zygomorphic, with 4–6 unequal acute teeth, the lowest longer and 0.8–1.4 mm long, the upper shorter and 0.2–0.5 mm long. Corolla glabrous, with standard initially pinkish and later blue, streaked with darker veins, 7.2–13 mm long. Standard claw is 3.4–6.1 × 2–4.2, while the limb is 4.4–9 × 3.6–7.9, markedly emarginate at the apex. Wings deeply auriculate at base, lilac–whitish, with lamina subequal to claw, 7–11.9 mm long and 2.5–4 mm wide; keel 6.6–10 mm long, lilac tinged with dark purple. Androecium pseudomonadelphous with staminal tube 5.2–9 mm long, slightly curved at end, anther yellowish ca. 0.4 mm, oblong. Ovary glabrous, 1–2 mm long, style compressed, with subapical ring of hairs. Legumes glabrous, acuminate, penninervate, 18.6–25(28) cm long, oblong–ellipsoid, convex laterally, brownish and twisting in dry state, 1–2 seeded with beak 1.7–3 mm long. Seeds spherical or elliptical, smooth, brownish, 3.5–5 mm long, 2.5–3mm wide, with hilum 1.5–2 mm long.

Etymology

The species is named in honor of Nicola Barbato (1856–1923), a socialist politician born in Piana degli Albanesi. He was well known for his efforts to promote farmers' emancipation and his activities combatting the mafia. Barbato frequently held notable rallies in Portella della Ginestra, a historic gathering place for local farmers, which in 1947 was the site of a tragic massacre carried out by the mafia against workers.

Distribution and ecology

Vicia barbatoi is represented only by a very localized and small population occurring in Portella della Ginestra near Piana degli Albanesi in the Palermo mountains (Figure 5). It flowers from late May to June and fruits in July, based on field observations and herbarium investigations. It grows on sub-humid clayey soils above calcareous substrata at an altitude of 880 m. It is linked to mesophilic meadows dominated by *Lolium arundinaceum* (Schreb.) Darbysh., *Dactylis glomerata* L., *Hordeum bulbosum* L., *Lolium multiflorum* Lam., *Magydaris pastinacea* (Lam.) Paol., *Phalaris coerulescens* Desf., *Prangos ferulacea* (L.) Lindl., *Thapsia asclepium* L., and so on. From a phytosociological viewpoint, this vegetation can be referred to a new association named *Lolio arundinaceae–Vicietum barbatoi* Cambria, Monari & Scafidi ass. nov. (holotype Table 2 rel. 1) belonging to *Molinio–Arrhenatheretea* R.Tx.1937 class. In particular, it can be attributed to the *Potentillo–Polygonetalia avicularis* R. Tx. 1947 order and *Mentho longifoliae–Juncion inflexi* T. Müller & Görs ex de Foucault 2009 alliance [27]. It is a meso-hygrophilic vegetation linked to humid deep soils with silty–clayey texture and a fair amount of organic matter. The structure of this vegetation is given by some rosulate and reptant hemicryptophytes with sub-nitrophilic requirements. This vegetation is dynamically connected with the deciduous oak forests of *Oleo-Quercetum virgilianae* Brullo 1984, while it establishes catenary contacts with the grasslands dominated by *Ampelodesmos mauritanicus* (Poir.) T.Durand & Schinz (*Lygeo sparti-Stipetea tenacissimae* Rivas-Martínez 1978) and the ruderal and segetal vegetation of the *Chenopodietea* Br.-Bl. in Br.-Bl. et al. 1952 class.

Table 2. Phytosociological surveys of the community with *Vicia barbatoi*. Char. Ass. = Characteristic species of association; Char. All. And Ord = Characteristic species of alliance and order; Char. Class = Characteristic species of class. Coverage indices according to the Braun-Blanquet scale: + few individuals; 1: $\leq$ 5%; 2: 5–25%; 3: 25–50%; 4: 50–75%; 5: 75–100%. The holotype is marked with "*" symbol.

***Lolio arundinaceae* − *Vicietum barbatoi* Cambria, Monari & Scafidi ass. nov.**		
Plot	**1***	**2**
Surface (mq)	30	30
Exposition (°N)	30	30
Slope (°)	30	30
Altitude (mslm)	880	880
Cover (%)	100	100
Char ass.		
Vicia barbatoi Scafidi, Ranno & Cambria	5	5
Char. All. and Ord.		
Lolium arundinaceum (Schreb.) Darbysh.	2	2
Phalaris coerulescens Desf.	1	2
Char. Class		
Daucus carota L.	1	1
Dactylis glomerata L.	1	2
Lolium multiflorum Lam.	2	1
Other species		
Avena sterilis Pott ex Link	1	+
Hordeum bulbosum L.	1	+
Bellardia trixago (L.) All.	+	+
Anethum foeniculum L.	+	+
Blackstonia perfoliata (L.) Huds.	+	+
Brachypodium retusum (Pers.) P.Beauv.	+	+
Carthamus caeruleus L.	+	+
Lathyrus aphaca L. subsp. *aphaca*	+	+

Table 2. *Cont.*

***Lolio arundinaceae* − *Vicietum barbatoi* Cambria, Monari & Scafidi ass. nov.**		
Lophiolepis scabra (Poir.) Del Guacchio, Bureš, Iamonico & P.Caputo	+	+
Lotus tetragonolobus L.	+	+
Macrobriza maxima (L.) Tzvelev	+	+
Magydaris pastinacea (Lam.) Paol.	+	+
Medicago sp.	+	+
Papaver rhoeas L. subsp. *rhoeas*	+	+
Picris hieracioides L.	+	+
Prangos ferulacea (L.) Lindl.	+	+
Prunus spinosa L. subsp. *spinosa*	+	+
Rubus ulmifolius Schott	+	+
Rumex thyrsoides Desf.	+	.
Scolymus hispanicus L.	+	.
Sixalix atropurpurea (L.) Greuter & Burdet	+	.
Sulla coronaria (L.) B.H.Choi & H.Ohashi	+	.
Thapsia asclepium L.	.	+
Trifolium angustifolium L. subsp. *angustifolium*	.	+
Trifolium campestre Schreb.	.	+
Trifolium physodes M.Bieb.	.	+
Urospermum dalechampii	.	+
Vicia villosa Roth	.	+
1–2: Portella della Ginestra, Piana degli Albanesi, 6/6/2025, D. Monari, F. Scafidi, S. Cambria, B. Inghilleri		

Conservation status

Vicia barbatoi is represented by a single population, growing in a cushion-like form and occupying an area of only about 110 m^2. The population is very dense and is formed by a consistent number of individuals. The plants grow on a small portion of grassland, next to a vineyard. Even though the growing area lies within a Natura 2000 site, specifically the ZPS/ZSC "Monte Iato, Kumeta, Maganoce e Pizzo Parrino" (ITA020027), agricultural activities pose a permanent, potential threat to the species. This population has been known for a long time and is characterized by great constancy: the occupied area, based on historic pictures as well as satellite records, seems to have remained approximately the same, with very little fluctuations, in the last thirty years. For this reason and since there are no elements that could suggest a decline in the future despite the extremely narrow area of occupancy, the species cannot be framed in any of the categories of threat, according to the A1,2,3,4, B(b,c), C1,2, D and E criteria of the IUCN protocols [35]. However, given the uncertainty in estimating the population size, the AOO much lower than 10 km^2, paired with the single growing location, we propose the classification of NT (nearly threatened). Possible conservation measures must involve local stakeholders, and could involve population fencing and identifying suitable surrounding areas to be left uncultivated for a hypothetical expansion, as well as maintaining the vegetation by extensive grazing following seed dehiscence.

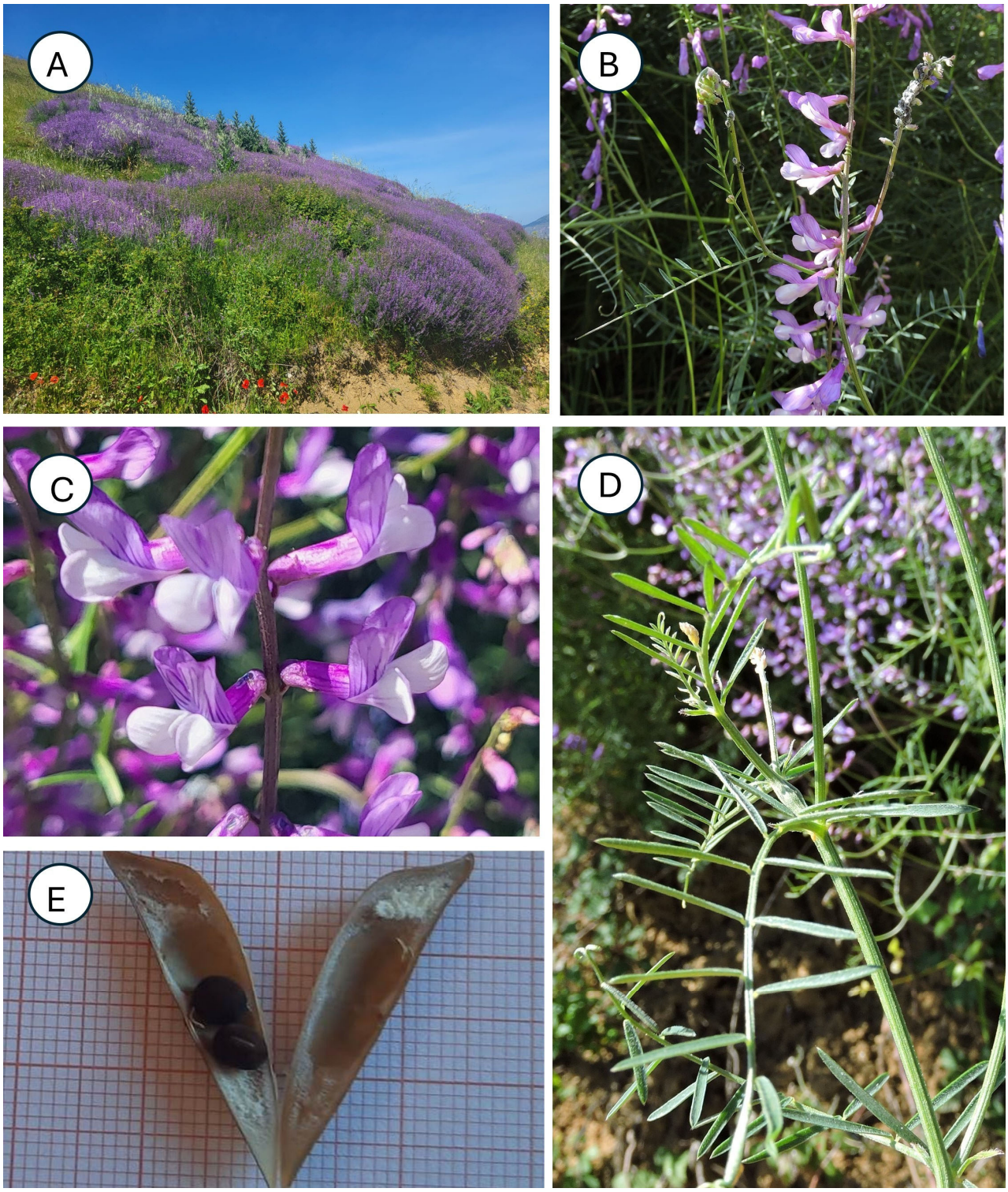

Figure 1. Morphological features of *Vicia barbatoi*: (**A**) Habit. (**B**) Inflorescence. (**C**) Flowers. (**D**) Leaves. (**E**) Pod. Photos by Beppe Di Gregorio.

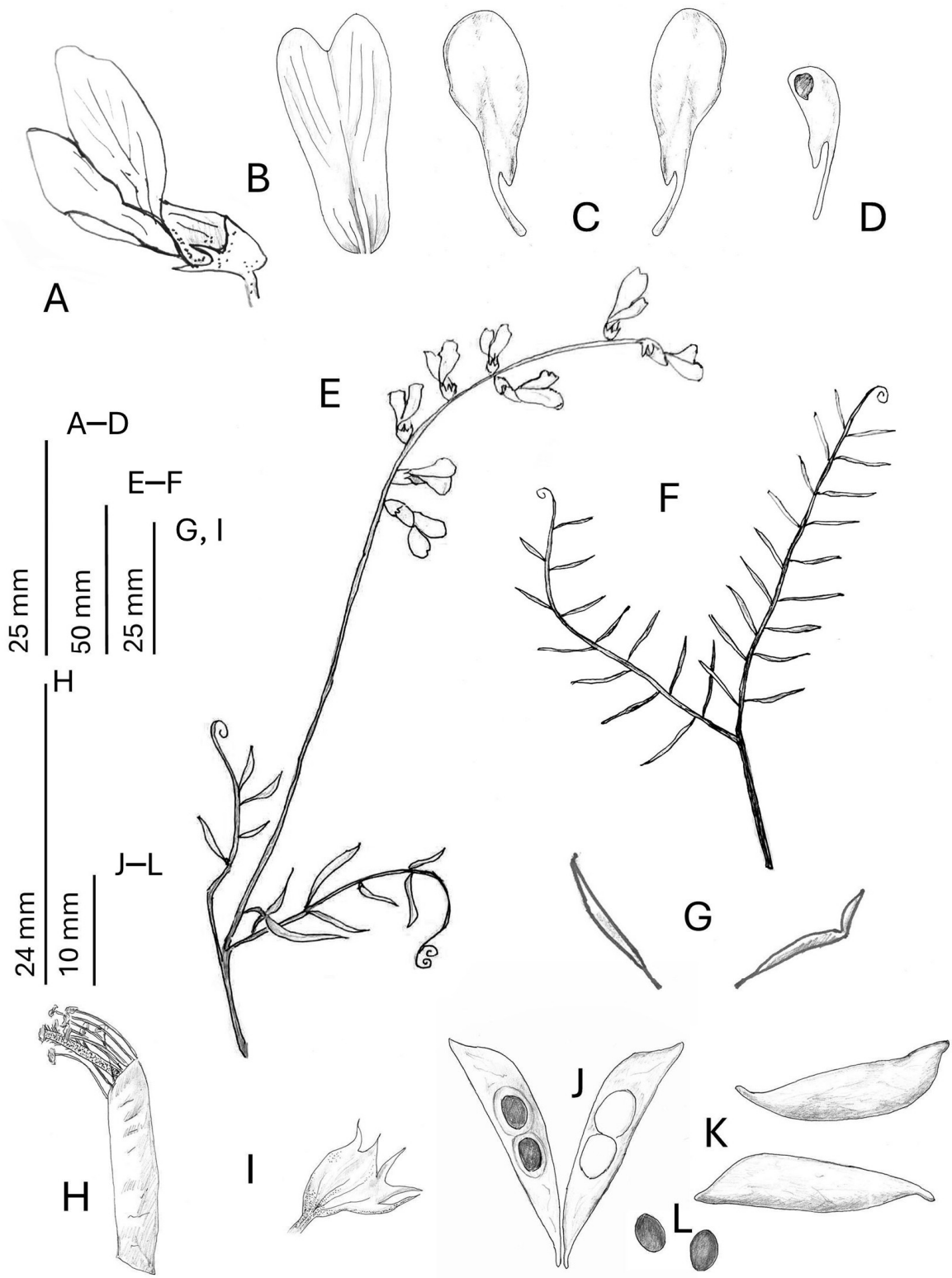

Figure 2. Iconography of *Vicia barbatoi*: (**A**) Flower in lateral view. (**B**) Standard. (**C**) Wings. (**D**) Keel petal. (**E**) Inflorescence. (**F**) Leaves. (**G**) Stipules. (**H**) Androecium and gynoecium. (**I**) Calyx. (**J**) Open pod with seeds. (**K**) Pods. (**L**) Seeds. Drawings by Rosaria Di Cicca.

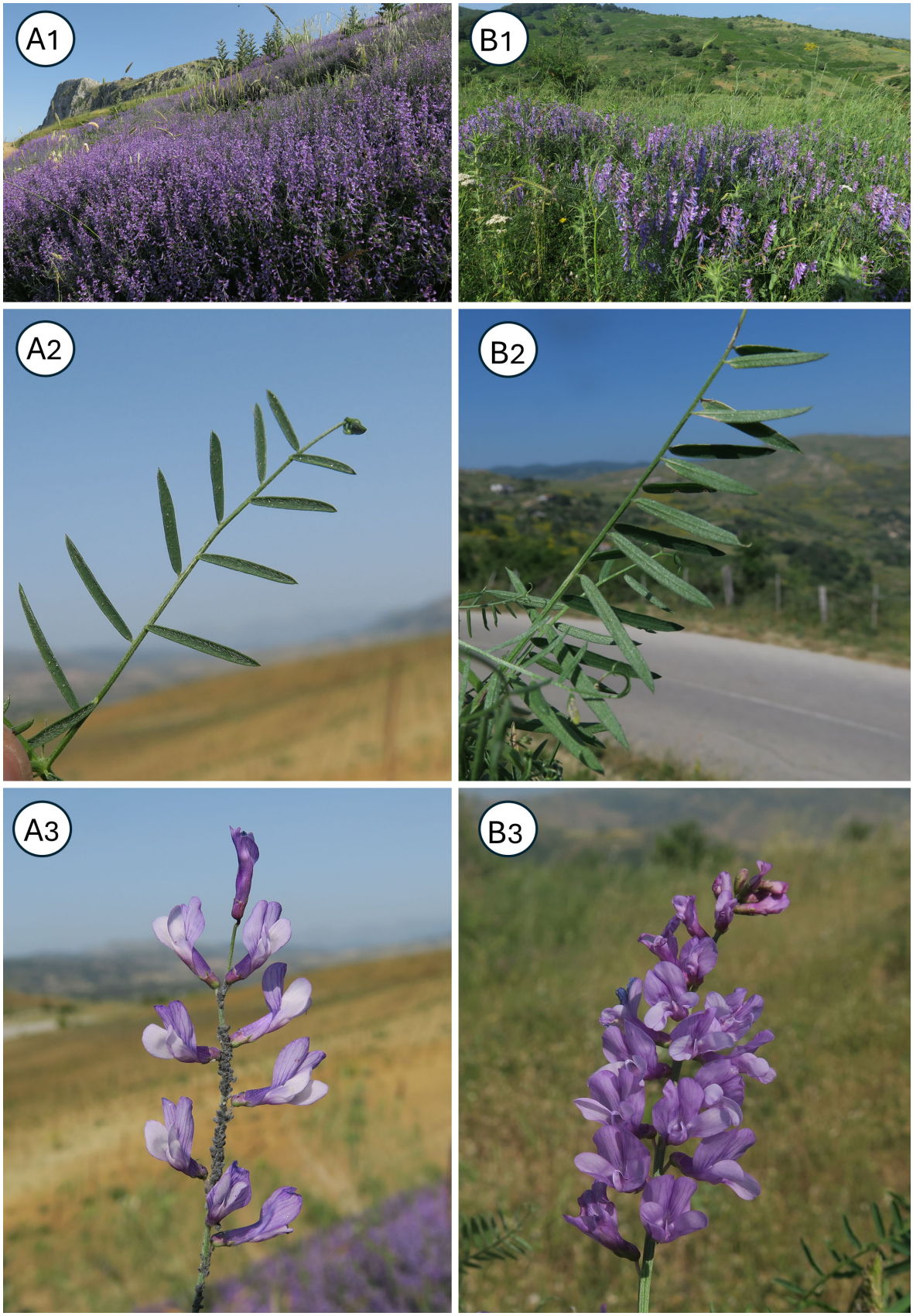

Figure 3. Morphological features of *Vicia barbatoi* ((**A1**): Habit, (**A2**): Leaves, (**A3**): Inflorescence) and *V. elegans* ((**B1**): Habit, (**B2**): Leaves, (**B3**): Inflorescence):. Photos by Salvatore Cambria.

Figure 4. Holotype of Vicia barbatoi stored in PAL herbarium.

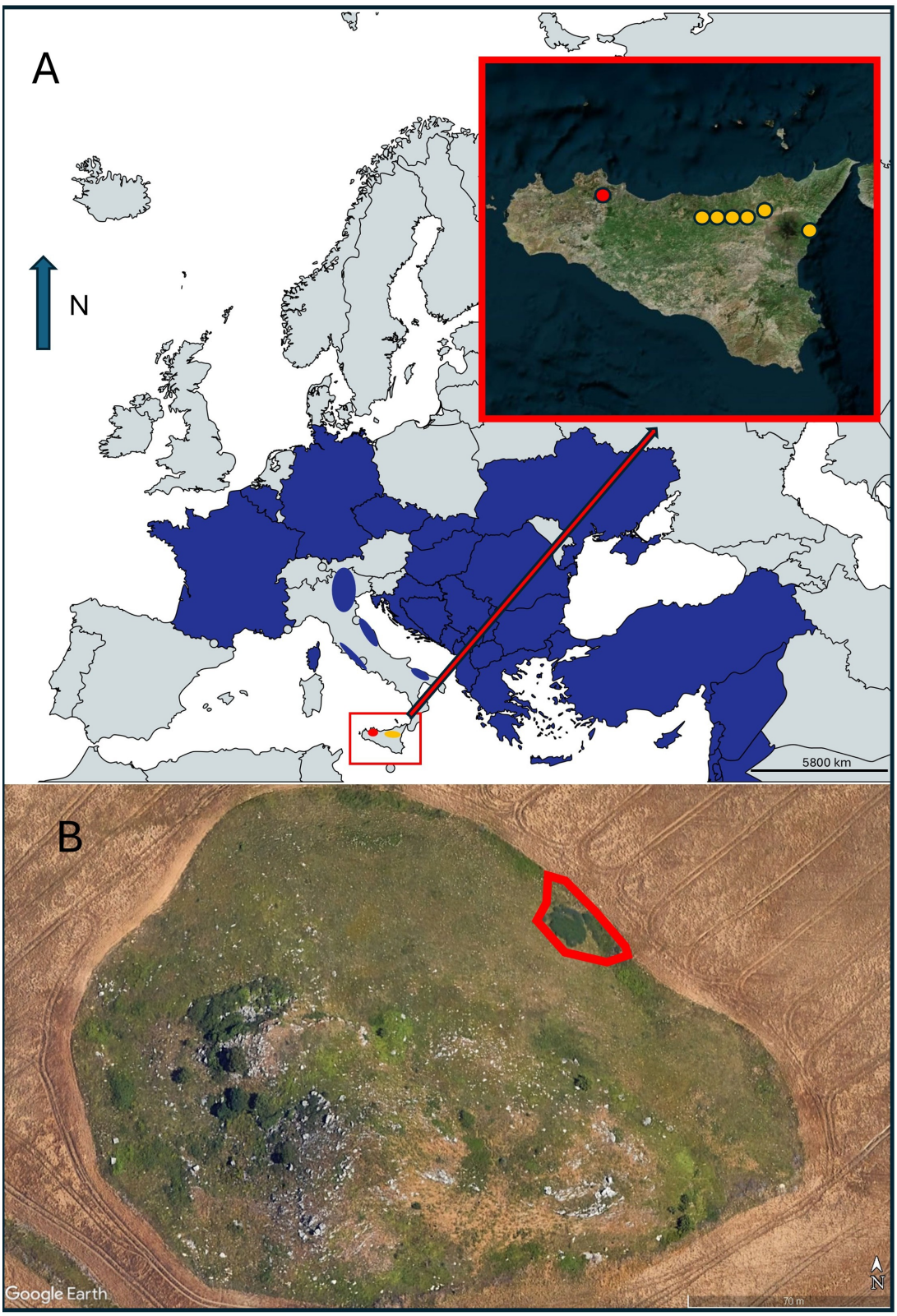

Figure 5. (**A**) Distribution map of *Vicia dalmatica* (blue), *V. elegans* (orange) and *V. barbatoi* (red) and detailing the local range of *V. elegans* and *V. barbatoi* in Sicily. (**B**) Detail of the punctiform range of *V. barbatoi*. Map from Google Earth Pro (2024), Maxar Technologies, used according to Google Earth Terms of Service.

(B) Vicia elegans Guss. Fl. Sic. Prodr. 2: 438—439. 1828, **Figures 3B and 6**

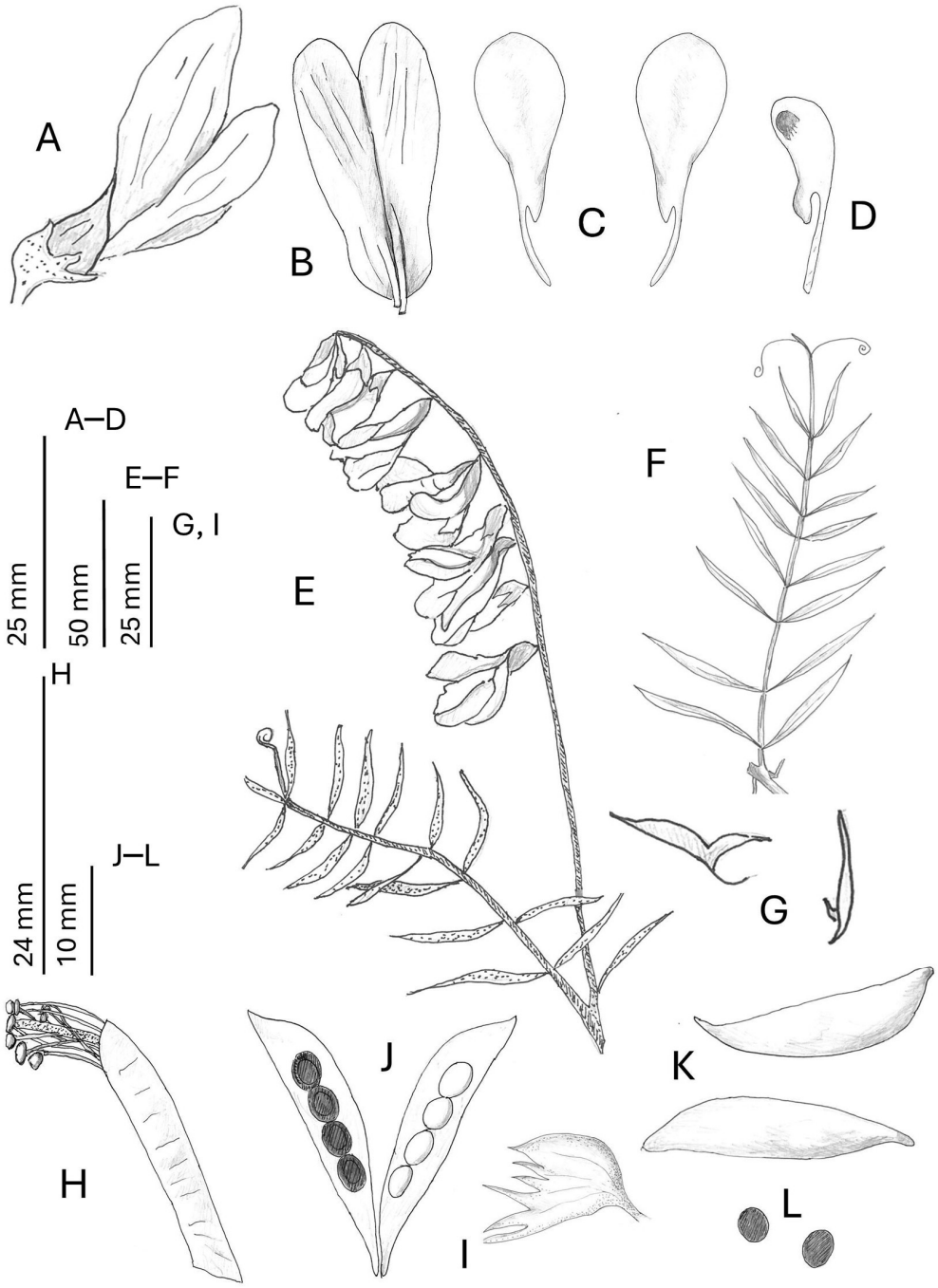

Figure 6. Iconography of *Vicia elegans*: (**A**) Flower in lateral view. (**B**) Standard. (**C**) Wings. (**D**) Keel petal. (**E**) Inflorescence. (**F**) Leaves. (**G**) Stipules. (**H**) Androecium and gynoecium. (**I**) Calyx. (**J**) Open pod with seeds. (**K**) Pods. (**L**) Seeds. Drawings by Rosaria Di Cicca.

Lectotype

ITALY. Sicily: "*Vicia elegans* Nob./Sicilia" [Gussone's handwriting]; "*Vicia*. . . . . /Sicilia/ sepibus ubique " [Gussone's handwriting] (NAP0005206!). Designated by Bajona & Selvi [36]. In his protologue, Gussone [10] refers to an illustrative plate (n. 210) of "Panphyton siculum" by Francesco Cupani [37] with a drawing of the plant with flowers that probably correspond to the taxon after described as *Vicia elegans*.

Synonyms

Vicia tenuifolia Roth subsp. *elegans* (Guss.) Nyman, Consp. Fl. Eur. 1: 206. 1878

Description

Perennial herb, climbing on supports or other plants, 30–100 cm high; with many annual stems arising from robust root. Stems with dense dichotomous branching, covered with appressed short fine hairs. Internodes 2.2–6.5 cm long, generally shorter in upper part. Stipules entire or sometimes semi-hastate, foliaceous, glabrous, margin smooth, not toothed, 4–9 mm long. Leaves sparsely hairy, paripinnate, 6.1–10.6 cm long (excluding tendril), with 14–22 leaflets, provided with terminal twining tendril, 9–26 mm long, often 2-branched, hairy; leaflets 13–28 × 1.5–3.5 mm, lanceolate, shortly attenuate at base, acute and mucronulate at apex, subsessile or shortly petiolate (to ca. 1mm long). Racemes 11–25-flowered, dense, longer than leaves, 82–150(185) mm long, sparsely hairy, more or less unilateral and with almost contemporary flowering. Flowers 13–17mm long, with pedicel 1–2.1 mm long. Calyx glabrous or slightly hairy, campanulate, green tinged with purple, 5-veined, with tube 2.8–4 mm long, zygomorphic, with 4–6 unequal acute teeth, the lowest longer and 1–1.4 mm long, the upper shorter and 0.2–0.9 mm long. Corolla glabrous, with standard initially lilac–pink and then purple, streaked with darker veins, 13–18 mm long. The standard claw is 5–7.8 × 5–7.8, while the limb is 8–11 × 6–10, markedly emarginate at the apex. Wings deeply auriculate at base, lilac–purple, with lamina subequal to claw, 12–16 mm long and 3–4 mm wide; keel 9–11 mm long, lilac tinged with dark purple. Androecium pseudomonadelphous with staminal tube 6–11 mm long, slightly curved at the end, anther yellowish ca. 0.4 mm, oblong. Ovary glabrous, 1–2 mm long, style compressed. Legumes glabrous, acuminate, penninervate, (23)25–37 cm long, oblong–ellipsoid, convex laterally, brownish and twisting in dry state, 3–6 seeded, with beak 1.8–3 mm long. Seeds spherical or elliptical, smooth, brownish, 3.5–5 mm long, 2.5–3 mm wide, with hilum 1.5–2 mm long.

Etymology

The specific epithet refers to the pleasant and elegant appearance of the species.

Distribution and ecology

According to Pignatti [12] and Bartolucci et al. [8], *Vicia elegans* should be considered an endemic species of central-southern Italy and Sicily. However, its exact range is not very clear, since some sources reported the species only for Latium, Calabria and Sicily [12], while according to Bartolucci et al., this species occurs also in other regions, such as Tuscany, Marche and Campania. Moreover, for the latter authors, the species is currently extinct in many regions, excluding Tuscany, Latium, Marche and Sicily. There are various reports regarding the presence of the species in Tuscany, some of which are very dubious and perhaps referable to *V. tenuifolia* as they are often weakly and doubtfully distinguished by these authors only on few characters of little taxonomic value, such as the color and size [38]. Furthermore, in the recent analytical flora of Tuscany, the presence of the species in this region is doubtfully mentioned without reference to specific locations [39]. For Latium there are only two reports from Percile and Vicovaro [9,40]; however, one of these localities coincides with a report for *Vicia dalmatica* and the few herbarium samples examined leave many doubts about its real presence in Latium, since they are probably attributable only to narrow-leafed forms of *V. tenuifolia*. These views are also affected by the opinion of Anzalone et al. [15], who do not distinguish *V. elegans* and *V. tenuifolia* as separate taxa, considering the latter only a narrow-leaved form of *V. tenuifolia* and differentiating *V. dalmatica* exclusively on the basis of the looser inflorescence and narrower leaflets. In the Marche region the species was probably confused with *V. tenuifolia*, while the presence of

V. dalmatica was recently confirmed in this region [16]. Finally, no other specimens were found that could confirm the past or present presence of *V. elegans* in Campania, Basilicata and Calabria, where there are only old reports in the literature that have never been confirmed and are not supported by herbarium material [41–46]. Based on our investigations, it is possible to hypothesize that the species is strictly endemic to Sicily (Figure 5); however, additional research is needed to confirm this. In Sicily the species is locally frequent only on the southern slope of the Nebrodi (NE Sicily) from Floresta to Capizzi; furthermore, there are two stations in Gangi and Polizzi on the Madonie area and in the past the species was also present on the eastern slope of Etna near Milo. Further records for other areas of the island cannot be confirmed. In its most abundant stations on the Nebrodi, the species generally grows between 900 and 1300 m, linked to siliceous substrata, and distributed within the humid mesomediterranean belt. Here the species characterizes a peculiar mesophilous forest community called *Vicio elegantis–Quercetum congestae* Brullo & Marcenò 1985. It is a mesophilous deciduous woodland with acidophilous requirements, where the canopy is dominated by *Quercus congesta* C. Presl. Sometimes the species is also found in grasslands, uncultivated lands, meadows and clearing. However, *V. elegans* is always linked to deep and mature soils, originating from siliceous substrates, mostly flysch. It flowers from late May to June and fruits in July, based on field observations and herbarium investigations.

Statistical analysis

Prior to performing comparative analyses, the Shapiro–Wilk normality test was applied to each morphometric trait for both *V. elegans* and *V. barbatoi*. Only five variables—plant height, total leaf length, internode length, number of flowers per inflorescence, and inflorescence length—returned p-values > 0.05 within each species, confirming a normal distribution and justifying the use of parametric tests. The one-way ANOVA and Tukey's post hoc test revealed significant interspecific differences in four of these traits ($p < 0.006$), while internode length showed no statistically significant variation ($p = 0.688$). Specifically, *V. elegans* exhibited a significantly lower mean plant height compared to *V. barbatoi* (−54 cm; $p < 0.001$), and a notably increased mean total leaf length (+23.4 mm; $p = 0.005$). The number of flowers per inflorescence was also higher in *V. elegans* (+9.4 flowers; $p < 0.001$), whereas its inflorescence length was significantly shorter (−72.5 mm; $p < 0.001$). A heat-map visualization of p-values across all evaluated traits further highlighted the significant differences—depicted in shades of blue—between the two species for plant height, leaf length, flower number, and inflorescence length, while internode length remained in the red zone ($p = 0.688$), indicating non-significance (Figure 7). The Mann–Whitney U test further revealed significant interspecific differences in the number of leaflets ($p = 0.004$) and in the number of seeds per pod ($p < 0.001$), while the number of calyx teeth did not differ significantly between the two species ($p = 0.172$).

The PCA performed on eight quantitative traits (plant height, total leaf length, number of leaflets, internode length, number of flowers per inflorescence, inflorescence length, number of calyx teeth and number of seeds per legume) further confirmed the morphological distinctiveness between the two taxa (Figure 8). The first two components explained 65.1% of the total variance (PC1: 50.0%; PC2: 15.1%). PC1 was mainly driven by plant height and inflorescence length (positive loadings) opposed to the number of flowers per inflorescence, number of seeds per legume, number of leaflets and total leaf length (negative loadings). Along this axis, *V. barbatoi* grouped toward positive scores, characterized by taller plants with longer but looser inflorescences bearing fewer flowers and seeds, whereas *V. elegans* clustered toward negative scores, showing shorter plants with denser inflorescences and a higher reproductive output. PC2 was mostly influenced by internode length, leaf length, and calyx teeth number, capturing additional but less marked differences between the species. Together, univariate and multivariate analyses consistently demonstrated that

V. barbatoi and *V. elegans* can be clearly distinguished based on a combination of vegetative and reproductive characters.

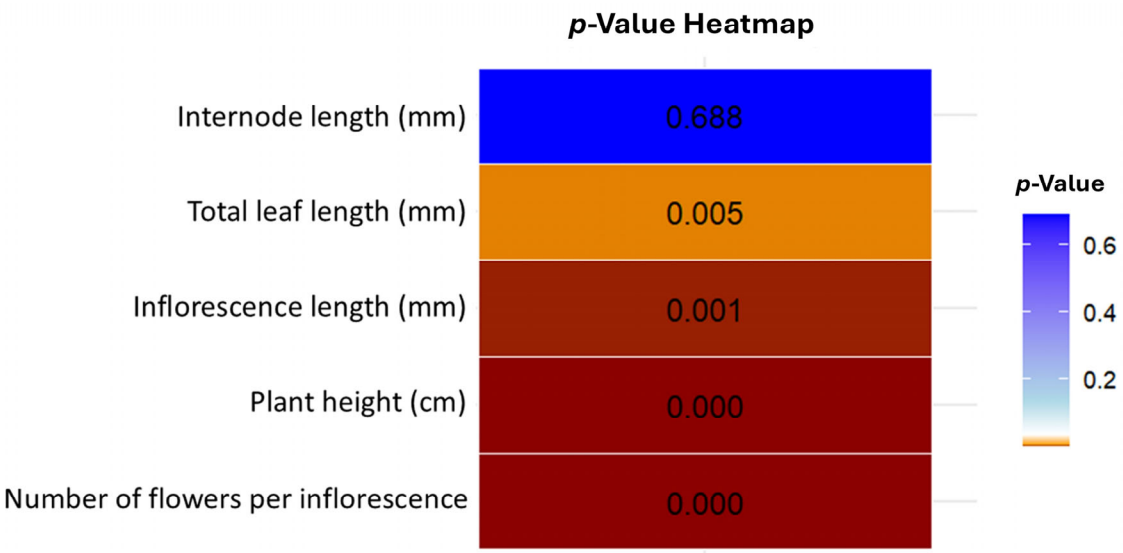

Figure 7. Heatmap showing the *p*-Values obtained from independent *t*-tests comparing five morphometric traits between *V. elegans* and *V. barbatoi*. Maroon cells indicate statistically significant differences ($p < 0.05$), while blue cells represent non-significant differences.

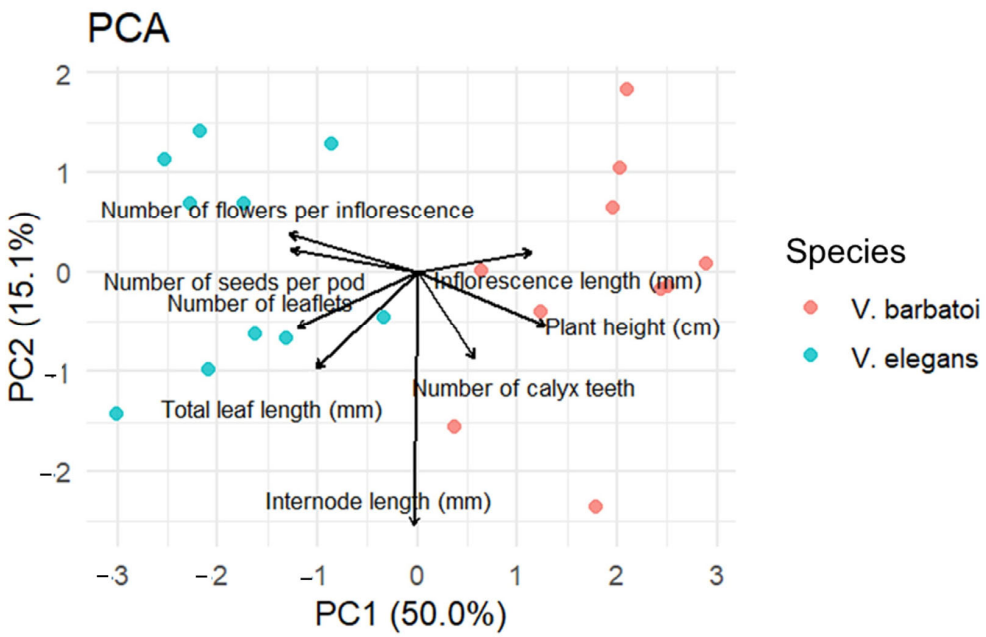

Figure 8. PCA biplot of *Vicia barbatoi* (red) and *V. elegans* (blue) based on eight quantitative traits (PC1 = 50.0%, PC2 = 15.1%).

A further PCA was performed taking into consideration all species of the *V. tenuifolia* group (Figure 9, Table 3). It highlights four fairly distinct groups among the specimens, consistent with the proposed taxonomic treatment. Overall, PC1 and PC2 together explain 62.2% of the variance. PC1 is mainly affected by leaflet width, number of leaflets, and inflorescence number of flowers, while PC2 depends on inflorescence length, seed number for pod and corolla length. The inflorescence length shows an inverse correlation with PC2: as the length of the inflorescence increases, the value of PC2 decreases. PC3 and PC4 explain a smaller amount of variance than PC1 and PC2. PC3 is mainly influenced by keel length (−0.830), suggesting that this component is related to flower shape. Regarding PC4, it is

mainly influenced by inflorescence length (0.753). In particular, *V. barbatoi* individuals (red dots) tend to concentrate in the lower left part of the graph, having negative PC1 and PC2 values. This suggests that, compared to the other groups, they have lower values for leaflet width and number of flowers (PC1) and long inflorescences (PC2). No significant variability is observed within the group. Individuals of *V. dalmatica* (green dots) cluster mainly in the upper left and central part of the graph. This indicates low values for leaflet width and flower number (PC1), and relatively shorter inflorescence (PC2). The compact clustering indicates a certain homogeneity within the group. *V. elegans* individuals (blue dots) are dispersed mainly in the central part of the graph, suggesting greater internal variability. They are characterized by slightly positive PC1 and PC2 values, suggesting larger leaflets, higher number of leaflets and flowers, as well as shorter inflorescence and larger corolla.

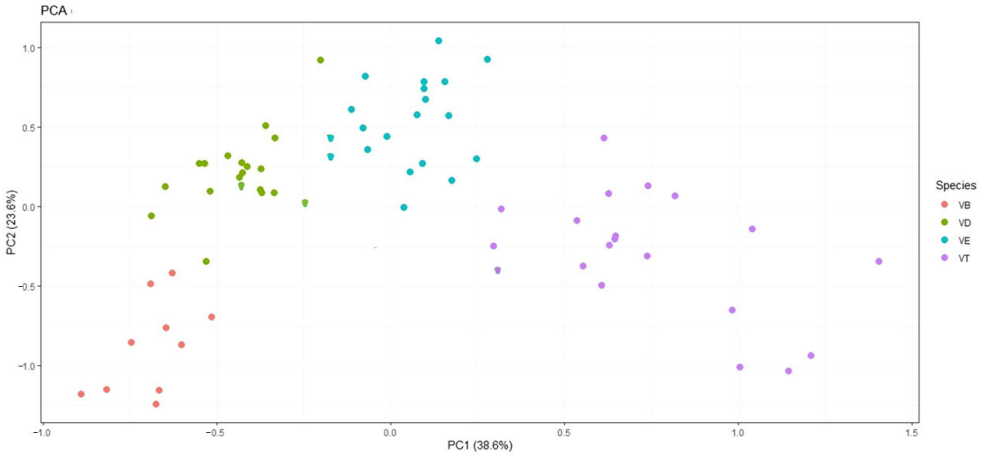

Figure 9. PCA of taxa belonging to *Vicia tenuifolia* group: VB = *V. barbatoi*, VE = *V. elegans*, VD = *V. dalmatica* (blue) and VT = *V. tenuifolia* based on seven morphological traits.

Table 3. Characters' loadings on the first four principal components for the PCA of Figure 8.

Character	PC1	PC2	PC3	PC4
1 Leaflet width	0.559	−0.0403	-1.96×10^{-2}	−0.110
2 Number of leaflet	0.541	−0.2147	17×10^{-4}	−0.0392
3 Inflorescence number of flowers	0.503	−0.0436	5.62×10^{-2}	−0.383
4 Inflorescence length	0.164	−0.570	7.28×10^{-2}	0.753
5 Seed number for pod	0.288	0.528	3.28×10^{-2}	0.246
6 Corolla length	0.123	0.506	5.48×10^{-1}	0.359
7 Keel length	0.128	0.303	-8.30×10^{-1}	0.289

The individuals of *V. tenuifolia* show a very remarkable dispersion in the central–right part of graph and a certain spatial separation from the other species, due to medium–low PC2 values and higher PC1 values. It indicates relatively higher inflorescence length and number of seeds for pod, larger corolla, larger leaflets and richer inflorescence. Furthermore, the arrangement of *V. tenuifolia* individuals suggests significant morphological variability in the species compared to other taxa. These analyses highlight that, from a morphological point of view, the new species is most closely related to *V. dalmatica* and *V. elegans*, which in turn are sufficiently distinct, especially in some traits such as the length of the corolla, keel and inflorescence. Finally, *V. tenuifolia* differs quite clearly from other related species in its habitus, the greater width of the leaflets, and the greater number of flowers in the inflorescence.

Seed micromorphology

According to the literature [47–49], the ornamentations of the seed coat surface in the *Vicia* genus (Fabaceae) have a remarkable diagnostic value, adding meaningful information chiefly useful for species identification. In particular, some micromorphological traits, such as testa pattern, papillae type, density, height, ribbing and surface deposits can be used to discriminate species in this genus. The SEM investigation carried out on *V. barbatoi* highlighted that the seeds (Figure 10(A1–A3) typically have an elliptical or spherical shape and are rounded at the extremities. Regarding the seed testa, it shows spaced and short papillae with a convex and smooth surface, having a dome-like shape. The anticlinal walls are almost indistinguishable due to the crowded papillae. For comparative purposes, the seed coat of *V. elegans* was also investigated, showing cells characterized by dense and long crimped papillae with a clear conical shape (Figure 10(B1–B3)).

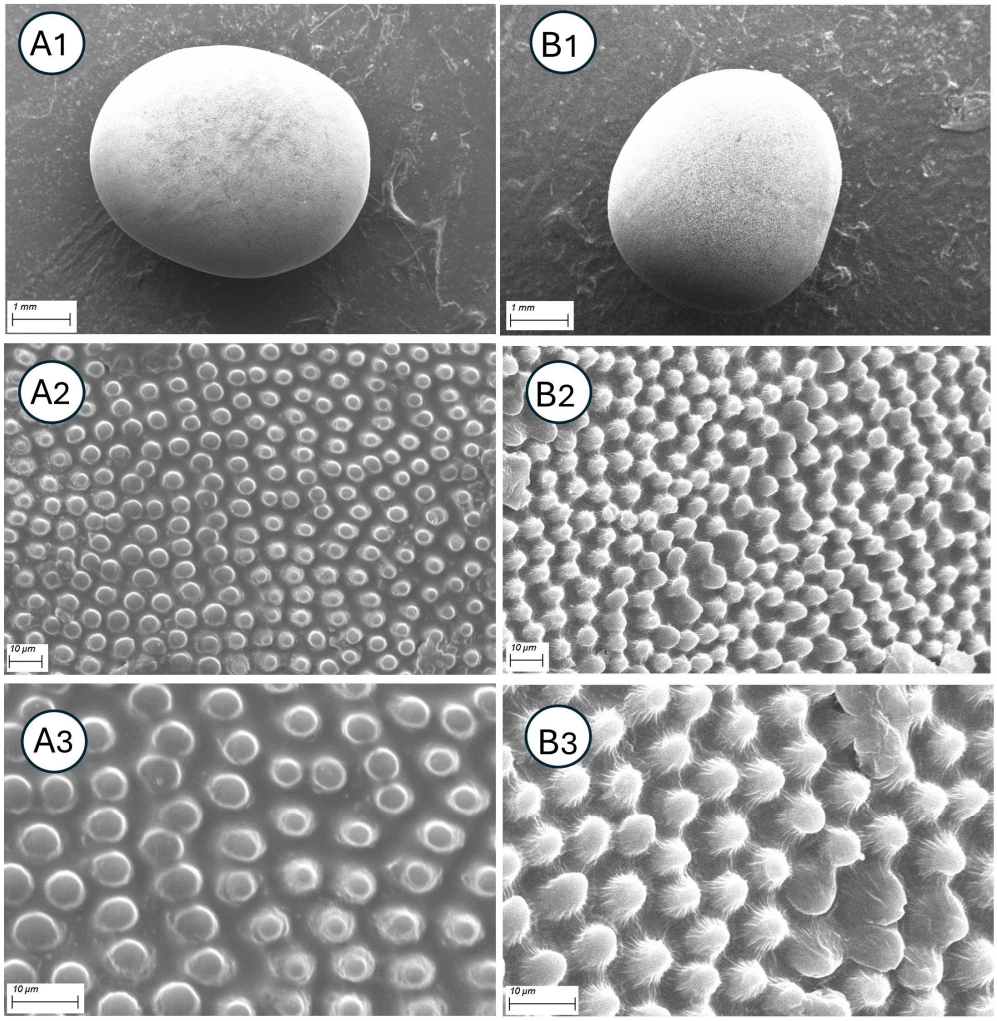

Figure 10. SEM micrographs of seed testa of Vicia barbatoi ((**A1**): Low magnification (×35), (**A2**): Medium magnification (×2000), (**A3**): High magnification (×4000)) from type locality (CAT), and Vicia elegans ((**B1**): Low magnification (×35), (**B2**): Medium magnification (×2000), (**B3**): High magnification (×4000)) from Capizzi (CAT).

4. Discussion and Conclusions

Based on our field and herbarium investigations, *Vicia elegans* is an intriguing endemic species of Sicily that is morphologically related to *V. dalmatica*, a species with a broad distribution across southeastern Europe, spanning from peninsular Italy to the Anatolian Peninsula and the Middle East. Regarding its distribution range, our study suggests

that most if not all records of *Vicia elegans* outside Sicily are attributable to *V. tenuifolia* or *V. dalmatica* (Figure 5). Contrary to what some authors have proposed [13,15], our results indicate that both are two distinct entities from *V. tenuifolia* and deserve the rank of species (Figure 9). Indeed, *V. elegans* and *V. dalmatica* show a bushy and stouter habit, leaflets narrowly linear and 0.5–2(3.5) mm wide (vs. oblong–linear, 2–5mm wide), inflorescence 8–25-flowered with almost simultaneous flowering (vs. inflorescence 15–36(50) flowered with progressive flowering from below to above) and flowers patent (vs. flower bent or curved downward).

However, *V. elegans* is clearly distinguished from *V. dalmatica* by its larger leaflets (1.5–2(3.5) mm vs. 0.5–1 mm), richer and denser inflorescences (up to 25 flowers), flowers colored lilac to purple (vs. reddish to blue), standard with limb shorter than wings (vs. subequal), keel 9–11 mm long (vs 7–9 mm) and calyx with a tube 2.8–4 mm long (vs. 1.5–2.5 mm), green tinged with purple, reddish purple (Figure 11). Furthermore, our study highlighted the presence of an additional species within the *Vicia tenuifolia* complex, described as a new species named *V. barbatoi*. In particular, from a morphological perspective, the new species is easily distinguished from *V. elegans* by very narrow leaflets (0.5–1.5 mm), poorer and looser inflorescence (5–11(14)–flowered), up to 270 mm long, more or less bilateral, flower with smaller corolla (7.6–13 mm), lilac–whitish wings and shorter legumes with only 1–2 seeds. Further statistical analyses highlighted specific traits particularly useful in distinguishing the two species, such as plant height, leaf length, flower number and inflorescence length. In addition, non-parametric analyses confirmed significant differences in leaflet number and seed number per pod, providing further support for the morphological distinctiveness of the two taxa. The Principal Component Analysis conducted on *V. barbatoi* and *V. elegans* highlighted their clear separation, with the first axis (50% of variance) effectively separating the two species on the basis of plant height, leaf length, flower number and inflorescence length. The broader analysis including all taxa of the *V. tenuifolia* group further supports this pattern, showing that *V. barbatoi* maintains a distinct morphological identity, yet is more closely related to *V. elegans* and *V. dalmatica*, whereas *V. tenuifolia* clearly diverges due to its broader leaflets and higher flower number. In addition, the congruence between univariate and multivariate results supports the reliability of the observed patterns. Moreover, micromorphological investigations carried out on the seed testa also support the distinction between the two species, particularly for different size and shape of papillae in the seed testa. The ecological preferences of the two species also differ, as *V. barbatoi* is a heliophilic species associated with basiphilous soils and less moist locations below 900 m altitude. In contrast, *V. elegans* is often sciaphilous, typically growing above 1000 m, and is linked to neutral or slightly acidic siliceous substrates. Regarding karyology, Campo et al. [50] investigated the only known population of *V. barbatoi* (cited as *V. elegans*) and reported a chromosome number of 2n = 12, whereas *V. tenuifolia* generally shows 2n = 24 or 2n = 28 [51–53]. Unfortunately, the chromosome number of *V. elegans* is not known. As for *V. dalmatica*, the chromosome counts known in the literature [54] show the same number as *V. barbatoi* (2n = 12). However, the two species are distinguished by several significant morphological traits, since *V. barbatoi* has a longer and looser inflorescence, flowers with a smaller corolla and legumes with a maximum of 2 seeds. Based on the chromosome number, it has been proposed that the tetraploid *V. tenuifolia* may derive from the diploids *V. dalmatica* and *V. incana* Gouan [55], although it cannot be excluded that *V. barbatoi* may have also contributed to the origin of *V. tenuifolia*.

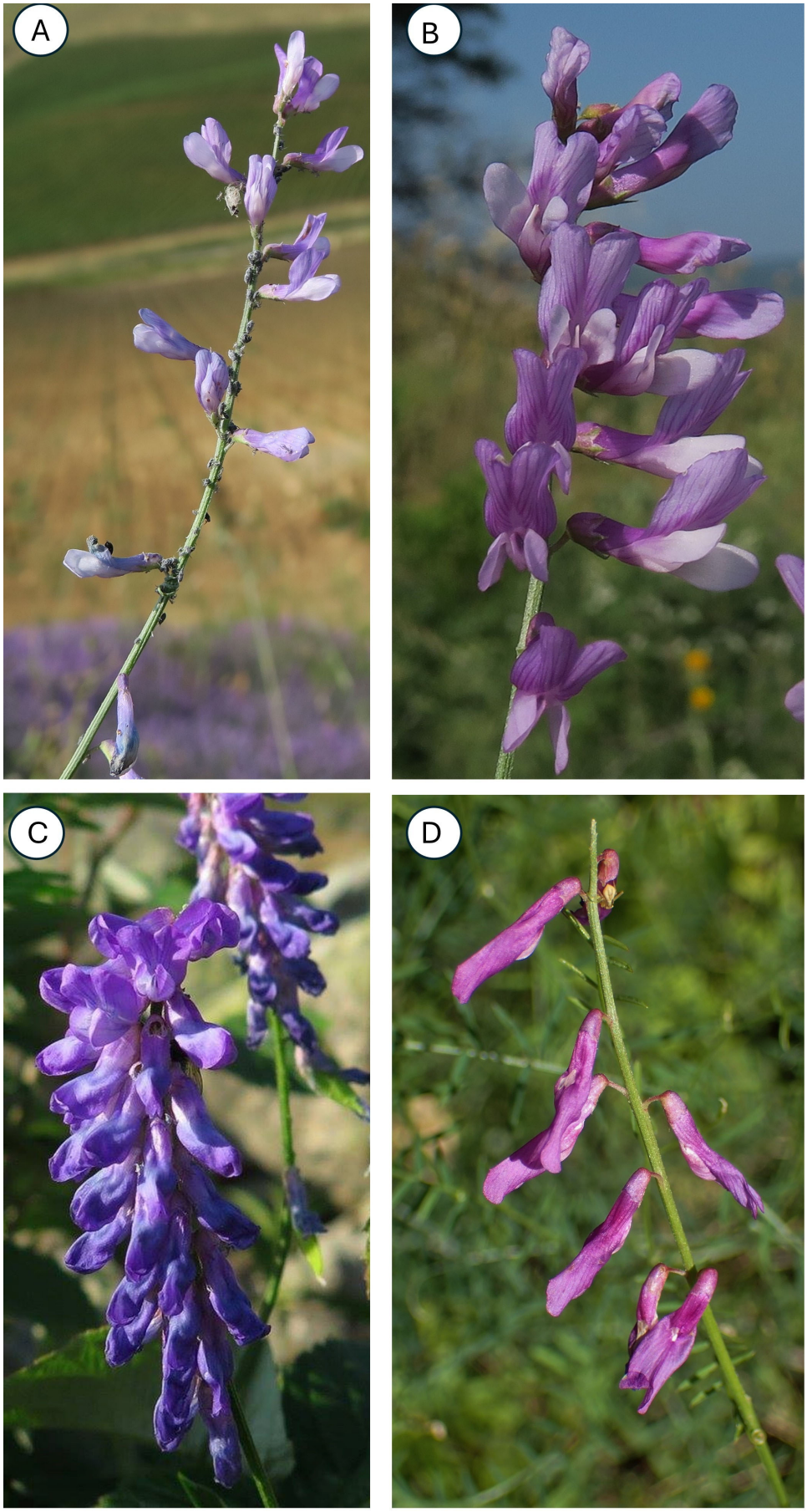

Figure 11. Inflorescences of *Vicia barbatoi* (**A**), *V. elegans* (**B**), *V. tenuifolia* (**C**), *V. dalmatica* (**D**). Photos by Salvatore Cambria (**A**–**C**) and by Nuno Veríssimo P. (**D**).

As noted by several authors [56,57], karyological and molecular studies can offer valuable insights for clarifying the taxonomic relationships within the *Vicia* genus. Therefore, further studies using these methods are highly recommended for the taxa within the *V. tenuifolia* group. At the same time, field surveys and herbarium research will be crucial to better understand the distribution of *V. elegans* and *V. dalmatica* across the Mediterranean, with a particular emphasis on Italy.

5. Key to the Taxa Belonging to *Vicia tenuifolia* Complex in Italy

1. Plant with slender habit and weakly twiggy, leaves with 16–30 leaflets oblong–linear, 2–5 mm wide, obtuse, inflorescence 15–36(50) flowered with progressive flowering from below to above, flowers bent or curved downward. . . . . *V. tenuifolia*
– Plant with bushy habit, leaves with 12–20 leaflets narrowly linear, 0.5–2(3.5) mm wide, acute, inflorescence 8–25 flowered with almost simultaneous (sometimes progressive) flowering, flowers patent. 2
2. Plant up to 1 m high, inflorescence more or less dense, up to 180mm long, almost unilateral, with flowers 13–20 mm long, pods with 3–6 seeds 3
– Plant up to 1.4 m high, inflorescence very lax, up to 270 mm long, bilateral, with flowers 7.6–13 mm long, pods with 1–2 seeds. . . . . *V. barbatoi*
3. Leaflet 1.5–2(3.5) mm wide, inflorescences 11–25 flowered, very dense, flowers with lilac to purple standard, with limb shorter than wings, keel 9–11 mm long, calyx tube 2.8–4 mm long, green tinged with purple, pod obliquely oblong. . . . . *V. elegans*
– Leaflet up to 1mm wide, inflorescence 8–18 flowered, laxer, flowers with reddish to blue standard, with limb subequal to wings, keel 7–9 mm long, calyx tube 1.5–2.5 mm long, reddish–purple, pod markedly attenuate at the base. . . . . *V. dalmatica*

Supplementary Materials: The following supporting information can be downloaded at: https://www.mdpi.com/article/10.3390/taxonomy5040063/s1, Table S1: Morphological traits of *Vicia barbatoi* and *V. elegans,* Table S2: Morphological traits of *V. barbatoi, V. elegans, V. dalmatica* and *V. tenuifolia* used for PCA (Figure 4).

Author Contributions: Conceptualization, S.C. and F.S.; methodology, S.C., F.S. and V.R.; software, V.R. and G.S.; formal analysis, V.R.; investigation, S.C., F.S. and D.M.; writing—original draft preparation, S.C., V.R., F.S. and D.M.; writing—review and editing, S.C., F.S., V.R., G.G.d.G., P.M., C.S. and A.L.R.; supervision, G.G.d.G., P.M., C.S. and A.L.R.; funding acquisition, V.R. All authors have read and agreed to the published version of the manuscript.

Funding: The APC was supported by funds from the Phd School in Earth and Environmental Sciences, University of Catania.

Data Availability Statement: The original contributions presented in this study are included in this article/Supplementary Materials. Further inquiries can be directed to the corresponding authors.

Acknowledgments: We thank R. Galesi, Gianluca Nicolella, A. Tilia, G. Certa, R. Vallariello, L. Lastrucci for their support in herbarium research, B. Inghilleri for his support in fieldwork, Valeria Tomaselli, Giuseppe Silletti, Manuela Porrovecchio, Sandro Bogdanovic for providing useful information and Beppe Di Gregorio and Nuno Veríssimo P. for providing some photos. Special thanks to R. Di Cicca for drawing the iconography.

Conflicts of Interest: The authors declare no conflicts of interest.

References

1. POWO Plants of the World Online. Facilitated by the Royal Botanic Gardens, Kew. Available online: http://www.plantsoftheworldonline.org/ (accessed on 19 December 2024).
2. Kupicha, F.K. The infrageneric structure of *Vicia*. *Notes R. Bot. Gard. Edinburgh.* **1976**, *34*, 287–326. [CrossRef]

3. Hanelt, P.; Mettin, D. Biosystematics of the genus *Vicia* L. (Leguminosae). *Annu. Rev. Ecol. Evol. Systematics.* **1989**, *20*, 199–223. [CrossRef]
4. Leht, M. Cladistic and phenetic analyses of relationships in *Vicia* subgenus *Cracca* (Fabaceae) based on morphological data. *Taxon* **2005**, *54*, 1023–1032. [CrossRef]
5. Ball, P.W. *Vicia* L. In *Flora Europaea*; Tutin, T.G., Heywood, V.H., Burges, N.A., Moore, D.M., Valentine, D.H., Walters, S.M., Webb, D.A., Eds.; Cambridge University Press: Cambridge, UK, 1972; Volume 3, pp. 129–136.
6. Davis, P. *Flora of Turkey, Volume 3: Flora of Turkey and the East Aegean Islands*; Edinburgh University Press: Edinburgh, UK, 1970; pp. 1–628.
7. Greuter, W.; Raus, T. Med–Checklist Notulae, 13. *Willdenowia* **1986**, *16*, 103–116.
8. Bartolucci, F.; Peruzzi, L.; Galasso, G.; Alessandrini, A.; Ardenghi, N.M.G.; Bacchetta, G.; Banfi, E.; Barberis, G.; Bernardo, L.; Bouvet, D.; et al. A second update to the checklist of the vascular flora native to Italy. *Plant Biosyst.* **2024**, *158*, 219–296. [CrossRef]
9. Anzalone, B.; Iberite, M.; Lattanzi, E. La Flora vascolare del Lazio. *Inf. Bot. Ital.* **2010**, *42*, 187–317.
10. Gussone, G. *Florae Siculae Prodromus Sive Plantarum in Sicilia Ulteriori Nascentium Enumeratio Secundum Systema Linneanum Disposita 2*; Ex Regia Typographia: Neapoli, Greece, 1828; pp. 1–586.
11. Kerner, A. *Schedae Ad Floram Exsiccatam Austro–Hungaricam IV*; Typographia Caesarea Regia Aulica et Imperiali: Vindobonae, Austria, 1886; pp. 1–114.
12. Pignatti, S. *Flora d'Italia*; Edagricole: Milano, Italy, 2017; Volume 2, pp. 1–1178.
13. Coulot, P.; Rabaute, P. Monographie des Leguminosae de France, tome 4: Tribus des Fabeae, des Cicerae et des Genistae. *Société Bot. Du Cent. –Ouest* **2016**, *46*, 1–901.
14. Lopriore, C. *Studi comparativi sulla flora lacustre della Sicilia*; Tip. Monaco e Mollica: Catania, Italy, 1900; pp. 1–116.
15. Anzalone, B.; Lattanzi, E. Note su *Vicia tenuifolia* Roth., *Vicia elegans* Guss. e *Vicia dalmatica* Kerner in Italia. *Ann. Bot.* **1987**, *45*, 121–131.
16. Baldoni, M.; Martinelli, M. Segnalazioni Floristiche Italiane 1083. *Inf. Bot. Ital.* **2003**, *35*, 109–110.
17. Buono, V.; Canzoneri, A.; Di Gregorio, B.; Longo, D.; Nicolella, G. Noterelle 0341–0393. Novità per la Flora Italiana e segnalazioni floristiche regionali. *Acta Plant. Notes* **2022**, *8*, 178–204.
18. Zohary, M. *Flora Palaestina 2*; Goldberg's Press: Jerusalem, Israel, 1972; pp. 1–489.
19. Muer, T.; Jahn, R.; Sauerbier, H. *Flora Cretica*; Kleinsteuber Versandbuchhandlung: Karlsruhe, Germany, 2024; pp. 1–1255.
20. Strid, A. *Mountain Flora of Greece, Volume 1*; Cambridge University Press: Cambridge, UK, 2010; pp. 1–852.
21. Nikolić, T. *Flora Croatica – vaskularna flora Republike Hrvatske*; ALFA: Zagreb, Croatia, 2019; Volume 4, pp. 1–664.
22. Meikle, R.D. *Flora of Cyprus 2*; Royal Botanic Gardens Kew: Kew, UK, 1985; pp. 1–1969.
23. Meusel, H.; Jäger, E.; Weinert, E. *Vergleichende Chorologie der Zentraleuropäischen Flora. Band I. Text*; Gustav Fischer Verlag: Jena, Germany, 1965; pp. 1–583.
24. Verloove, F. *Vicia tenuifolia* subsp. *dalmatica* (Fabaceae) ongemerkt ingeburgerd in België en omliggende gebieden. *Dumortiera* **2013**, *102*, 40–44.
25. Fridlender, A. Observations sur quelques vesces (*Vicia* L., Leguminosae) rares et menacées des colonies xérothermiques d'Auvergne: *V. melanops* Sibth. et Sm., *V. loiseaui* (d'Alleizette) Fridlender comb. stat. nov. et *V. dalmatica* A. Kerner. *Bull. Mens. De La Société Linnéenne De Lyon.* **2009**, *78*, 141–157. [CrossRef]
26. Romano, S.; Ottonello, D.; Marcenò, C. Contributo alla floristica siciliana: Nuovi rinvenimenti e ulteriori dati distributive di alcune entità indigene ed esotiche. *Nat. Sicil. S. IV.* **1994**, *18*, 3–14.
27. Brullo, S.; Marcenò, C. Contributo alla conoscenza della classe *Quercetea ilicis* in Sicilia. *Not. Fitosociologico.* **1985**, *19*, 183–229.
28. Gianguzzi, L.; D'Amico, A.; Caldarella, O. *La flora vascolare dei Monti di Palermo*; Azienda Regionale Foreste Demaniali: Palermo, Italy, 2007; pp. 1–360.
29. Bazan, G.; Marino, P.; Guarino, R.; Domina, G.; Schicchi, R. Bioclimatology and Vegetation series in Sicily: A geostatistical approach. *Ann. Bot. Fenn.* **2015**, *52*, 1–18. [CrossRef]
30. R Core Team. *R: A language and environment for statistical computing*; R Foundation for Statistical Computing: Vienna, Austria, 2024. Available online: https://www.R-project.org/ (accessed on 31 August 2025).
31. Thiers, B. Index Herbariorum: A Global Directory of Public Herbaria and Associated Staff; New York Botanical Garden's Virtual Herbarium. Available online: http://sweetgum.nybg.org/ih (accessed on 10 June 2025).
32. Braun–Blanquet, J. *Pflanzensoziologie. Grundzüge der Vegetationskunde*; Biologische Studienbücher: Berlin, Germany, 1928; pp. 1–330.
33. Mucina, L.; Bültmann, H.; Dierßen, K.; Theurillat, J.-P.; Raus, T.; Čarni, A.; Šumberová, K.; Willner, W.; Dengler, J.; Gavilán García, R.; et al. Vegetation of Europe: Hierarchical floristic classification system of vascular plant, bryophyte, lichen, and algal communities. *Appl. Veg. Sci.* **2016**, *19*, 3–264. [CrossRef]

34. Bachman, S.; Moat, J.; Hill, A.W.; de la Torre, J.; Scott, B. Supporting Red List threat assessments with GeoCAT: Geospatial conservation assessment tool. In: Smith V, Penev L (Eds) E–Infrastructures for data publishing in biodiversity science. *ZooKeys* **2011**, *150*, 117–126. [CrossRef] [PubMed]
35. IUCN Guidelines for Using the IUCN Red List Categories and Criteria. Version 13. Prepared by the Standards and Petitions Subcommittee, Cambridge U.K. Available online: http://iucnredlist.org/documents/RedListGuidelines.pdf (accessed on 19 June 2025).
36. Bajona, E.; Selvi, F. Typification of names of Italian endemic taxa of vascular plants. *Ann. Bot.* **2025**, *in press*.
37. Cupani, F. *Panphyton siculum. 1713*; Re-edition edited by Pastena, C; Anselmo, A; Zimmardi, M.C.; Regione siciliana, Assessorato dei beni culturali ed ambientali e della pubblica istruzione, Dipartimento dei beni culturali ed ambientali e dell'educazione permanente, Biblioteca centrale della Regione siciliana: Palermo, Italy, 2003; pp. 490–491.
38. Sforzi, S.; Selvi, F. Flora vascolare della palude «Diaccia Botrona» (Castiglione della Pescaia, Grosseto). *Atti Della Soc. Toscana Di Sci. Nat. Mem. Ser. B* **1999**, *106*, 99–114.
39. Arrigoni, P.V. *Flora Analitica della Toscana, Volume 4*; Polistampa: Firenze, Italy, 2018; pp. 1–512.
40. Lucchese, F. *Atlante Della Flora Vascolare del Lazio—2*; Agenzia Regionale Parchi: Roma, Italy, 2019; pp. 1–397.
41. Arcangeli, G. *Compendio Della Flora Italiana, Ed. 1*; E. Loescher: Torino, Italy, 1882; pp. 1–889.
42. Arcangeli, G. *Compendio Della Flora Italiana, Ed. 2*; E. Loescher: Torino, Italy, 1894; pp. 1–836.
43. Fiori, A.; Paoletti, G. *Flora Analitica d'Italia*; Tipografia del Seminario: Padova, Italy, 1900; Volume 2, pp. 1–492.
44. Fiori, A. *Nuova Flora Analitica d'Italia*; Tipografia M. Ricci: Firenze, Italy, 1925; Volume 1, pp. 1–944.
45. Gavioli, O. Synopsis Flora Lucanae. *Nuovo G. Bot. Ital. n.s.* **1948**, *54*, 10–272. [CrossRef]
46. Moraldo, B.; La Valva, V.; Ricciardi, M.; Caputo, G. - La flora dei Monti Picentini (Campania). Pars prima: Selaginellaceae - Umbelliferae. *Delpinoa n.s.* **1981**, *23–24*, 203–291.
47. Sciandrello, S.; Giusso del Galdo, G.; Salmeri, C.; Minissale, P. *Vicia brulloi* (Fabaceae), a new species from Sicily. *Phytotaxa* **2019**, *418*, 57–78. [CrossRef]
48. Lersten, N.R.; Gunn, C.R. Testa characters in tribe Vicieae, with notes about tribes Abreae, Cicereae, and Trifolieae (Fabaceae). *USDA Tech. Bull.* **1982**, *1667*, 1–40.
49. Han, S.; Sebastin, R.; Lee, K.J.; Wang, X.; Shin, M.J.; Kim, S.H.; Lee, S.; Lee, J.R.; Cho, G.T.; Hyun, D.Y.; et al. Interspecific variation of seed morphological and micro-morphological traits in the genus *Vicia* (Fabaceae). *Microsc. Res. Tech.* **2021**, *84*, 337–357. [CrossRef] [PubMed]
50. Campo, G.; Romano, S.; Marcenò, C. Numeri cromosomici per la flora Italiana: 1401-1408. *Inf. Bot. Ital.* **1999**, *30*, 47–51.
51. Roti-Michelozzi, G. Karyotype varation by whole arm translocation in italian specimens of *Vicia cracca* group (Fabaceae). *Atti Della Soc. Toscana Di Sci. Nat. Pisa Mem. Ser. B.* **1993**, *99*, 75–84.
52. Roti-Michelozzi, G. Agmatoploidia nell'evoluzione del gruppo di *Vicia cracca* L. *G. Bot. Ital.* **1992**, *126*, 297.
53. Roti-Michelozzi, G.; Allione, S. Numeri cromosomici per la flora italiana: 1118-1126. *Inf. Bot. Ital.* **1988**, *19*, 305–313.
54. Ali, H.B.M.; Osman, S.A. Genetic relationship study of some *Vicia* species by FISH and total seed storage protein patterns. *J. Genet. Eng. Biotechnol.* **2020**, *18*, 37. [CrossRef] [PubMed]
55. Rousi, A. Cytotaxonomical studies on *Vicia cracca* L. and *V. tenuifolia* Roth. III. The relation between karyotype and morphology. *Ann. Bot. Fenn.* **1973**, *10*, 89–96.
56. Caputo, P.; Frediani, M.; Gelati, M.T.; Venora, G.; Cremonini, R.; Ruffini Castiglione, M. Karyological and molecular characterisation of subgenus *Vicia* (Fabaceae). *Plant Biosyst.* **2013**, *147*, 1242–1252. [CrossRef]
57. Han, S.; Sebastin, R.; Wang, X.; Lee, K.J.; Cho, G.-T.; Hyun, D.Y.; Chung, J.-W. Identification of *Vicia* Species Native to South Korea Using Molecular and Morphological Characteristics. *Front. Plant Sci.* **2021**, *12*, 608559. [CrossRef] [PubMed]

Disclaimer/Publisher's Note: The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.