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## The identity of *Paeonia corsica* SIEBER ex TAUSCH (Paeoniaceae), with special reference to its relationship with *P. mascula* (L.) MILL.

With one Map, 5 Figures and 3 Tables

### Summary

The taxonomy of the genus *Paeonia* in central Mediterranean islands has been controversial, with number of recognized taxa changing greatly from one species without infraspecific division to three species or five infraspecific taxa in one species, and with the number of synonyms as great as 30. In the present work, the taxonomic history is thoroughly reviewed and a taxonomic revision is made based on extensive field work, chromosome observation, population sampling, examination of a large amount of herbarium specimens, and subsequent statistic analysis. As a result of the studies *P. corsica* SIEBER ex TAUSCH, an ignored specific name, is restored at specific rank, and the species is found distinct from all the three subspecies of *P. mascula* in this region in having mostly nine (vs  $\geq 10$ ) leaflets/segments, shorter hairs (1.5 mm vs 3 mm long) on carpels, rather densely holosericeous (vs glabrous or very sparsely hirsute) on the lower surface of leaves. It is a diploid, confined to Corsica (France), Sardinia (Italy), Ionian Islands and Akarnania Province of Greece, whereas *P. mascula* is a tetraploid, widely distributed from Spain to Turkey and Iraq, but not in Corsica, Sardinia and W Greece. In addition, type specimens of four taxa are designated, and 29 botanic names are listed as synonyms of *P. corsica* in this paper.

### Zusammenfassung

Die Identität von *Paeonia corsica* SIEBER ex TAUSCH (Paeoniaceae), mit besonderem Bezug auf ihre Verwandtschaft mit *P. mascula* (L.) MILL.

Die Taxonomie der Gattung *Paeonia* auf den zentralen Mittelmeerinseln ist stets kontrovers gewesen. Die Anzahl der Taxa wechselte zwischen einer Art ohne infraspezifische Differenzierung bis zu drei oder fünf infraspezifische Taxa innerhalb einer Art. Die Anzahl der Synonyme beträgt bis zu 30 Taxa. In vorliegender Arbeit wird die Geschichte der Taxonomie sorgfältig betrachtet und eine taxonomische Revision auf der Basis extensiver Feldstudien, Chromosomen-Bewertung, Sammlungen von Populationen, der Untersuchung zahlreicher Herbarproben und abschließender statistischer Analysen vorgenommen. Im Ergebnis dieser Untersuchungen wird *Paeonia corsica* SIEBER ex TAUSCH, ein bislang unbeachteter Artname, erneut in den Rang einer Art erhoben. Diese in dieser Region gefundene Spezies wurde als verschieden von den drei Unterarten von *Paeonia mascula* befunden. Sie hat meist neun ( $\geq 10$ ) Blättchen, kürzere Haare (1.5 mm vs 3 mm lang) auf dem Karpell dichtere holoserios (vs glabrous oder selten hirsut) auf der Blattunterseite. *Paeonia corsica* ist diploid auf Korsika (Frankreich), Sardinien (Italien), den Ionischen Inseln und der Provinz Akarnania in Griechenland, während *Paeonia mascula* tetraploid ist und weit verbreitet von Spanien bis in die Türkei und den Irak, fehlt aber auf Korsika, Sardinien und in Westgriechenland. Außerdem werden Typspecimen für 4 Taxa festgelegt. Als Synonyme von *P. corsica* wurden 29 Namen aufgelistet.

## Introduction

During our long-term study on the genus *Paeonia*, taxonomy of the genus in central Mediterranean islands (Corsica/France, Sardinia/Italy, Sicily/Italy, Ionian Islands, Euboea and the adjacent mainland of Greece) (Map 1) was found to be problematic. There are two distinct groups in this region. One is *P. peregrina* which is confined to Ionian Islands and S Apennini Peninsula, and has roots tuberous and leaflets/segments 55–110 in number, all lobed. There is little conflict among taxonomists with its identity and circumscription since STAPP (1918). The other is *P. mascula* and its allies. Their leaflets are usually entire or some of them segmented with leaflets/segments up to 20, and their roots are carrot-shaped. The great controversy in taxonomy comes from this group. First, *Paeonia russoi* BIV. (BIVONABERNARDI 1816) and *Paeonia corsica* SIEBER ex TAUSCH (1828) were described respectively from Sicily and Corsica effectively and validly, but the latter has been neglected in recent taxonomic literature. Second, the taxonomic treatments of the peonies from Corsica, Sardinia and Sicily has been extremely controversial. The number of botanic names is as high as 30 for the peonies in Corsica and Sardinia, and 16 for those in Sicily. Even recently the controversy is still remarkable. All the peonies in Corsica and Sardinia were treated by CULLEN & HEYWOOD (1964a, b) as a single taxon, *Paeonia mascula* subsp. *russoi*, but they were recognized by ZANGHERI (1976) as three taxa in two species, *P. mascula* subsp. *mascula* and subsp. *russoi*, and *P. coriacea*, and by PIGNATTI (1982) and AKEROYD (1993) as two species, *P. mascula* subsp. *russoi* and *P. coriacea*, or by SCHMITT (1997) as a single species with two subspecies, *P. mascula* subsp. *russoi* and subsp. *coriacea*. CESCA and his co-workers (CESCA et al. 2001) described one more new species from Sardinia, *P. morisii*. In Sicily, STERN (1946) recognized the only one taxon, *P. russoi*, but SCHMITT (1997) recognized three subspecies in *P. mascula*: subsp. *mascula*, *russoi* and *hellenica*. Third, *P. mascula* subsp. *mascula* was reported from Boeotia Province, Central Greece, *P. mascula* subsp. *russoi* from Ionian Islands and the adjacent mainland of Greece by TZANOUDAKIS (1977), and *P. mas-*

*cula* subsp. *hellenica* was described as new from Euboea and adjacent islands by TZANOUDAKIS (1977).

It is clear from the above short statement that there are a number of questions concerning the genus *Paeonia* in the region under study. Therefore, a solid taxonomic revision is necessary for *Paeonia* in this region, but it must be based on a critical review of taxonomic history, field observation, population sampling and subsequent analysis.

In the present work we thoroughly reviewed taxonomic history, examined a large amount of specimens in the herbaria listed below, and conducted extensive field work, population sampling and chromosome observations in the region under study. We thank the National Geographic Society for its financial support (Grant 6939-00 and Grant 7225-02). The statistic analysis was carried out based on both sampled populations and herbarium specimens.

## Taxonomic history and questions

*Paeonia corsica* SIEBER ex TAUSCH (1828) was described as new from Mt. Cagna, Corsica. The protologue states “germinibus glabris erectis; foliis biternatimsectis, laciniis integris ovatis acuminates subglaberrimis”. This peony with “carpels glabrous” and “leaves nearly glabrous” was then taxonomically treated controversially. COSSON (1850) described this form as a new variety, *P. corallina* var. *leiocarpa*, ignoring *P. corsica*, but later he (COSSON 1887) treated it as a variety, *P. corallina* var. *corsica*. *P. corsica* was neglected by LYNCH (1890). HUTH (1891) recognized this form as *P. corallina* var. *cambessedesii* WILLK. (WILLKOMM 1875) with *P. corsica* treated as its synonym. WILLKOMM'S variety was originally described from the Balears, Spain. ROUY & FOUCAUD (1893) recognized it at form rank, *P. corallina* f. *corsica*. FIORI (1898) recognized it at varietal rank but under a different specific name, *P. officinalis* subsp. *corallina* var. *corsica*. GÜRKE (1903) recognized this plant as *P. mascula* var. *corsica*. ASCHERSON & GRAEBNER (1923) restored *P. corallina* var. *corsica* COSS. (COSSON 1887), while treated *P. corallina* var. *leiocarpa* COSS. and *P. cambessedesii* WILLK. as its synonyms. In a recent monograph of *Paeonia*, STERN (1946)

treated all the names with “*corsica*” as synonyms of *P. russoi* var. *leiocarpa*. Following STERN (1946) no any later author recognized “*corsica*” as a valid name at any rank except HALDA (2004). For example, ZANGHERI (1976) identified SIEBER’S form in Sardinia as *P. coriacea* BOISS. (BOISSIER 1838), which was originally described from S Spain, without mentioning *P. corsica*; PIGNATTI (1982) identified SIEBER’S peony as *P. coriacea*, treating *P. corsica* as its synonym, and this treatment was followed by SCHMITT (1997). AKEROYD (1993) treated *P. corsica* as a synonym of *P. mascula* subsp. *russoi*.

Thus, SIEBER’S peony has been given specific, varietal and form ranks, with various names. The name *P. corsica* has been neglected by most recent authors who dealt with *Paeonia* in the region under study, e.g. CULLEN & HEYWOOD (1964a, b), ZANGHERI (1976), AKEROYD (1993), SCHMITT (1997).

SIEBER’S peony is not the only form of *Paeonia* in Corsica and Sardinia. A number of other forms have been described and treated controversially. A form with leaves pilose beneath and carpels tomentose was described as a new variety by MORIS (1837) from Sardinia with a sample from Corsica quoted in the protologue, *P. corallina* var. *pubescens*, which was reduced by COSSON (1887) as a synonym of *P. corallina* var. *russoi* (BIV.) COSS. (= *P. russoi* BIV.). *P. russoi* BIV. (BIVONA-BERNARDI 1816) was described originally from Panorm, Sicily. It is characterized by leaves “supra glabris, subtus vix pubescentibus”, carpels “duo, recurvatae, pilose”, and “petala 5–6, obovata, chermisina”. HUTH (1891) identified a peony in Corsica and Sardinia with leaves pubescent and carpels glabrescent when mature as *P. corallina* var. *russoi*. ROUY & FOUCAUD (1893) recognized a form with glabrous or pubescent leaves and tomentose carpels as *P. corallina* f. *ovatifolia* (BOISS. & REUT.) ROUY & FOUCAUD, and that with usually pubescent leaves and tomentose carpels as *P. corallina* f. *triternata*. *P. broteri* var. *ovatifolia* was originally described from Spain by BOISSER & REUTER (1842); the type locality of *P. triternata* PALL. ex DC. is Crimea, Ukraine. A form with another combination of characters, i.e. carpels glabrous but leaves pubescent, was described as a new variety from Corsica by

LEGRAND (1899), *P. russoi* var. *reverchoni*. Also from Corsica JORDAN (1903) described two new species: *P. revelieri* with leaves pubescent beneath and red along nerves, and carpels tomentose, and *P. glabrescens* with leaves polished and carpels 3–7, tomentose. Again from Corsica BRIQUET (1910) described a new taxon with leaves glabrescent, *P. corallina* var. *pubescens* f. *hypoleuca*. Interestingly, with so many botanic names available for *Paeonia* in Corsica and Sardinia, CESCA et al. (2001) described an additional new species from Sardinia, *P. morisii*, which is characterized by purplish stems, almost always nine leaflets with long, irregularly bent and abundant hairs on the lower surface. This name was recognized by PASSALACQUA & BERNARDO (2004).

Five infraspecific taxa were recognized by ASCHERSON & GRAEBNER (1923) in Corsica and Sardinia. If JORDAN’S two species, not mentioned by them, are included, the number of taxa in Corsica and Sardinia would be seven in three species. At the other extreme, only one taxon, *P. mascula* subsp. *russoi*, was recognized by CULLEN & HEYWOOD (1964a, b) in the whole region under study. Therefore, the number of taxa recognized in Corsica and Sardinia changed from one (CULLEN & HEYWOOD 1964) to seven (ASCHERSON & GRAEBNER 1923). And the number of botanic names ever used for *Paeonia* in Corsica and Sardinia is as great as 30.

In Sicily, the first botanist recording *Paeonia* is BIVONA-BERNARDI (1816), who described *Paeonia russoi* as new, as mentioned above. The taxon was then treated controversially. GUSSONE (1843), LYNCH (1890) and STERN (1946) maintained *P. russoi* as specific status. However, WEBB (1838) treated it as a variety, *P. corallina* var. *russoi*, and this treatment was followed by COSSON (1887), HUTH (1891), SCHIPCZINSKY (1921), and ASCHERSON & GRAEBNER (1923). GÜRKE (1903) also recognized it as a variety, but under a different specific name: *P. mascula* var. *russoi*. CULLEN & HEYWOOD (1964a, b), ZANGHERI (1976), PIGNATTI (1982), AKEROYD (1993) and SCHMITT (1997) treated it as a subspecies, *P. mascula* subsp. *russoi*, and all considered the subspecies also present in Corsica and Sardinia. TZANOUDAKIS (1977) extended the distribution range of this subspecies to Ionian Islands and

the adjacent mainland, Akarnanian Province, of Greece. Recently PASSALACQUA & BERNARDO (2004) treated the taxon as a variety, *P. mascula* subsp. *mascula* var. *russoi*. They included Calabria in the distribution range of this taxon. In addition to this taxon, PRESL (1822) described a new species from Sicily, *P. flavescens*, which was treated by GUSSONE (1843) as a variety, *P. corallina* var. *flavescens*, but was recognized at specific rank by SCHIPCZINSKI (1921). The following taxa were also considered present in Sicily: *P. corallina* var. *broteri* by ASCHERSON & GRAEBNER (1923), *P. mascula* subsp. *mascula* and subsp. *hellenica* TZANOUD. (TZANOUDAKIS 1977) by STEARN & DAVIS (1984), AKEROYD (1993), and SCHMITT (1997). Thus, 16 botanic names have been used for *Paeonia* in Sicily. The number of taxa of *Paeonia* in Sicily is also controversial. Only one monotypical taxon, *P. russoi*, was recognized by STERN (1946) but at the other extreme, four taxa were recognized by ASCHERSON & GRAEBNER (1923), or three subspecies in one species, *P. mascula* subsp. *mascula*, *russoi* and *hellenica* were recognized by AKEROYD (1993) and SCHMITT (1997).

In Greece, TZANOUDAKIS (1977) reported the presence of *P. mascula* subsp. *mascula* in Boeotia Province, Central Greece, and Aegean Islands, and *P. mascula* subsp. *russoi* in Ionian Islands and the adjacent mainland, Akarnania Province. *P. mascula* subsp. *hellenica* TZANOUD. (TZANOUDAKIS 1977) was originally described from Euboea, an Aegean island.

TZANOUDAKIS (1977, 1983) reported the chromosome number  $2n = 20$  for *P. mascula* subsp. *mascula* from two localities of Boeotia Province, Greece, and for subsp. *hellenica* from three localities of Euboea and one locality of Andros, Greece, and  $2n = 10$  for subsp. *russoi* from Ionian Islands (Levkas, Kefallonia and Zakynthos), and Akarnania Province, Greece. RAIMONDO et al. (1983) reported  $2n = 20$  for *P. mascula* subsp. *russoi* from Sicily; BERNARDO et al. (1995) reported  $2n = 20$  for *P. mascula* subsp. *russoi* in Calabria of Italy. CESCA et al. (2001) shew that a peony from Sardinia had chromosome number  $2n = 10$ . BARBER (1941) and STERN (1944, 1946, 1949) gave the chromosome number  $2n = 20$  for *P. russoi* and its varieties, but they did not indicated the precise localities. Thus, it seems,

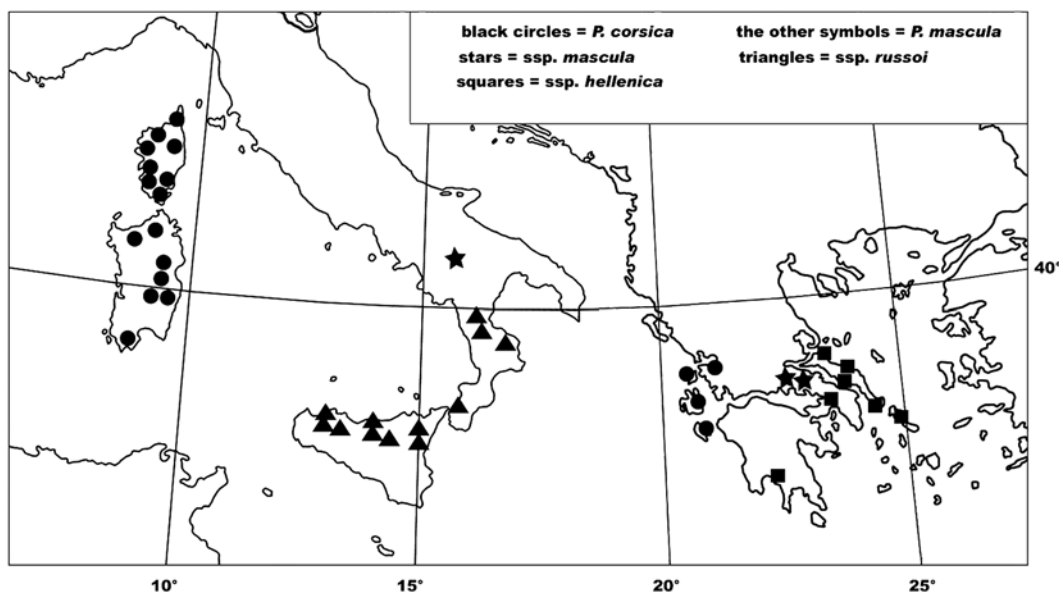
and as SCHMITT (1997) stated, that *P. mascula* subsp. *russoi* (sensu CULLEN & HEYWOOD 1964, and TZANOUDAKIS 1977) comprised two ploid levels, diploid ( $2n = 10$ ) and tetraploid ( $2n = 20$ ).

From the review of taxonomic history of the peony in the region under study (Fig. 4), we can see the questions: 1) How the indumentum on carpels and the lower side of leaves and the number of leaflets/segments should be evaluated in taxonomic significance; 2) How many entities are there actually in Corsica and Sardinia; 3) How is the differentiation of the peony and how many taxa of it are there in Sicily; 4) How is the peony actually differentiated in the region under study; what are the relationships among *P. mascula* subsp. *mascula*, subsp. *russoi* and subsp. *hellenica*; 5) What is the relationship in morphology and taxonomy between the diploid and tetraploid populations in the studied area and 6) How should we treat the different taxa in this area; it seems that the nomenclature of the peony in this region ought to be considered.

## Materials and methods

### Population sampling

We conducted in 2001 and 2002 extensive field works on *Paeonia* in the Mediterranean region and sampled eleven populations of the *Paeonia mascula* group in France, Corsica, Italy, Sardinia, Sicily, and Akarnania Province and Euboea in Greece: D. Y. HONG, X. Q. WANG & FRIDLENDER H01013, H01014 and H01015 from Corsica, H01016 and H01018 from Sardinia, H01019 and H021020 from Sicily, H021023 from Potenza, Italy, FRIDLENDER H01004 and D. Y. HONG, X. Q. WANG & FRIDLENDER H01030 (the same population) from Clermont-Ferrand, France; D. Y. HONG, D. M. ZHANG & X. Q. WANG H02225 from Akarnania Province, Greece, and H02226 from Euboea, Greece (Table 1). Three to 16 individuals were randomly collected (see Table 1 for sampling size). Usually three or four individuals were dug up with roots for observation and transplantation, another four were harvested only for the aerial part leaving the underground part *in situ* and intact, and the other individuals were obtained only for one lower leaf. Ecological parameters of the populations were documented. The vouchers are preserved in the herbaria: Institute of Botany, the Chinese Academy of Sciences (PE), the Missouri Botanic Garden (MO), the Royal Botanic Garden, Kew (K), the Harvard University Herbaria (A), Cali-



Map 1

Map of central Mediterranean region, showing the distribution of *Paeonia corsica* SIEBER ex TAUSCH and *P. mascula* (subsp. *mascula*, subsp. *russoi* and subsp. *hellenica*)

fornia Academy of Sciences, Department of Botany (CAS), The Natural History Museum, UK (BM) or in University of Patras, Department of Biology (UPA).

#### Chromosome preparation

Somatic metaphase of four populations was observed in the present work. The origins of materials are shown in Table 1. Root tips were harvested from individuals transplanted to Beijing Botanic Gardens, the Chinese Academy of Sciences. They were pretreated in an aqueous solution of 0.05% colchicine and 0.002M 8-oxyquinoline for five hours before being washed and fixed in Carnoy I fixative (absolute alcohol and acetic acid 3:1) overnight, and then transferred to 70% alcohol. For chromosome preparation, the material was washed and macerated for one and half minute in a mixed solution of 1N HCl and absolute alcohol (1:1), and was then stained in Carbol fuchsin before being squashed.

#### Morphological observations and statistical analysis

In addition to intensive observation on all the specimens from the sampled populations, our morphological observation was also made on a large amount of herbarium specimens of the *Paeonia mascula* group in Goulandris Natural History Museum, Greece (ATH); Freie Universität Berlin, Botanischer

Garten und Botanisches Museum Berlin-Dahlem, Berlin, Germany (B); Natural History Museum, UK (BM); Royal Botanic Garden, Herbarium, Edinburgh, UK (E); Conservatoire et Jardin botanique de la Ville de Geneve, Herbarium, Switzerland (G); Karl-Franzens-Universität, Institut für Botanik, Herbarium, Graz, Austria (GZU); the Royal Botanic Gardens, Kew, UK (K); University of Lund, Botanical Museum, Sweden (LD); Real Jardin Botanico, Herbario, Madrid, Spain (MA); Museum National d'Histoire Naturelle, Laboratoire de Phanerogamie, Herbar, Paris, France (P); Città Universitaria, Università degli Studi di Roma Dipartimento di Biologia Vegetale, "La Sapienza", Erbario, Roma, Italy (RO); Universität Wien, Institut für Botanik, Herbarium, Wien, Austria (WU), and other herbaria.

The *Paeonia mascula* group in France and Italy, in Sicily, and in Greece, were included in the statistic analysis in addition to *Paeonia* in Corsica, Sardinia and in W Greece (Ionian islands and Akarnania Province) according to the above review of taxonomic history. Although *P. cambessedesii* with the type locality in Mallorca, Spain, was recorded in Corsica by HUTH (1891), the recent literature (STERN 1946; CULLEN & HEYWOOD 1964a, b; ZANGHERI 1976; PIGNATTI 1982; AKEROYD 1993; SCHMITT 1997) do not recognize the presence of the species in Corsica and Sardinia. And our intensive observations both in the field and herbaria show that this is an independent species distinct from *P. mascula* and

Table 1  
The variation of morphological characters of the *Paonia mascula/corsica* group in central Mediterranean islands and adjacent regions (the vouchers in A, CAS, K, MO, PE, UPA and US) (to be continued)

Populations and sampling size (n)	Localities	Number of leaflets/segments of lower leaves <sup>1</sup>	Indumentum on lower side of leaves	Petal colour	Carpels		Chromosomes	
					Number <sup>1</sup>	Indumentum	Colour	
							Density <sup>2</sup>	Hair length (mm)
H01013 (12)	Corsica: Galeria, Capo Manganello	9(9), 10(2), 11(1)	2(3), 3(9), 4(1)	HO	2(1), 3(1), 4(1)	4(3)	1.5	
H01014 (12)	Corsica: Galeria, Capo dia Media	7(1), 9(10), 12(1)	2(1), 3(8), 4(2)	HO	1(1), 2(6), 3(3), 4(2), 4(6)	4(6)	1.5	purple
H01015 (13)	Corsica: Mt. Cagna	9(10), 10(1), 13(1), 20(1)	0(9), 1(1), 2(3)	HO	1(2), 3(4), 4(1), 5(1)	0(3), 3(2), 4(3)	1.5	purple, red or green
H01016 (13)	Sardinia: Nuoro, above Oliena	9(12), 10(1)	0(1), 3(2), 4(10)	HO	2(3), 3(4), 4(4), 5(2), 4(5)	4(5)	1.5	green or green but partially purple
H01018 (13)	Sardinia: the Gen-nargentu Range	9(10), 10(1), 12(1), 16(1)	3(4), 4(9)	HO	2(1), 3(6), 4(4), 5(3), 3(2), 4(7)	4(7)	1.5	green, partially purple
H02225 (12)	Greece: Akarnania	9(11), 10(1)	1(3), 2(9)	HO	4(3), 5(2), 6(1)	3(2), 4(2)	1.5	2n = 10 (CESCA et al. 2001); 2n = 10 (Fig. 1) 2n = 10 (TZANOUDA-KIS 1977, 1983); 2n = 10 (Fig. 1) 2n = 10 (TZANOUDA-KIS 1977, 1983)
herbarium specimens (56)	Greece: Lefkas, Kefallinia, Zakynthos	9(45), 10(3), 11(7), 12(1)	0(2), 1(4), 2(25), 3(15), 4(4)	HO				2n = 20 (BERNARDO et al. 1995) 2n = 20 (HONG et al., unpublished)
H021023 (10)	Italy: Potenza	11(2), 12(3), 13(3), 14(2)	0(8), 1(2)	HI	2(2), 3(4)	5(6)	2.5–3.0	green
H01030 (12)	France: Clermont-Ferrad	13(1), 14(3), 15(3), 16(2), 17–28(3)	0(4), 1(8)	HI	3(5), 4(2), 5(4)	5(4)	3.0	green
H01019 (3)	Sicily: Mt. Pizzuta	12(1), 17(1), 20(1)	1(2), 2(1)	HI	5(1)	5(3)	3.0	green
H01020 (13)	Sicily: Pollizi, Generosa, Mt. Carbonara	9(1), 10(1), 11(1), 12(4), 13(3), 14(2), 15(1)	0(2), 1(10), 2(1)	HI	2(2), 3(4), (mostly?) 4(2)	5(7)	3.0	green
herbarium specimens (24 or 8)	Sicily	9(1), 10(1), 11(1), 12–15(5)	0(4), 1(17), 2(3)	HI	white or partially red	5(24)	3.0	2n = 20 (RAIMONDO et al. 1983) 2n = 20 (TZANOUDA-KIS 1977, 1983); 2n = 20 (Fig. 1)
H02226 (16)	Greece: Euboea	9(2), 11(3), 14(4), 13–18(7)	0(11), 1(4), 2(1)	HI	2(7), 3(38), 4(18), 5(7), 6(1), 9(1)	5(71)	3.2	

<sup>1,2</sup> The figures before parenthesis indicate the number or density grade (see text); those in parenthesis indicate the number of individuals observed

<sup>3</sup> HO = holosericeous; HI = hispid

*P. corsica*. Both the sampled populations and herbarium specimens were used in the statistics. Each individual was treated as an OTU.

Based on the review of taxonomic history in the region under study, the characters used in the analysis and their coding are listed in Table 2. Two types of hairs on the lower surface of leaflets/segments could be recognized. One type is of thin, long and bent hairs, and thus are called holosericeous, while the other is of long but straight hairs, and are thus called hispid. CESCA et al. (2001) also recognized these two types and showed their differences with SEM photographs. To relatively objectively describe the density of indumentum on the lower surface of leaves and on carpels we divided the density more or less arbitrarily into six grades with "0" expressing entirely glabrous, "1" extremely sparsely hairy, and "5" the most densely hairy, completely covering the surface, while "2", "3" and "4" in between (Table 1). Different types of hairs on carpels have never been reported among *Paeonia* under study. Hairs on carpels of the peony in Corsica, Sardinia, Ionian islands and Akarnania Province of Greece were found to be 1.5 mm long, while those in France, Italy and Boeotia Province of Greece (*P. mascula* subsp. *mascula*), Sicily (subsp. *russoi*) and in Aegean islands (Euboea, Andros, etc.) (subsp. *hellenica*) 3 mm long.

A data matrix was made respectively for Corsica (CO), Sardinia (SA), Ionian islands and Akarnania Province of Greece (IA), France and Italy (FI), Sicily (SI), and Aegean region (AE), with each individual as an OTU, and using nine characters or character states (Table 2). Gower General Similarity Coefficient was used in the analysis. Both Cluster Analysis and Principal Coordinate Analysis were conducted using MVSP-Version 3.13b analysis software.

## Results

### Chromosome observation

Our observations shew that the population H01018 from Sardinia and the population

H02225 from Akarnania Province, W Greece, had somatic chromosomes  $2n = 10$  (Fig. 1: a, b), which are consistent with the reports of CESCA and his co-workers (CESCA et al. 2001) from Sardinia and TZANOUDAKIS (1977, 1983) from Ionian Islands and the adjacent mainland, Akarnania Province, W Greece; the population H01020 from Sicily, Italy, and the population H02226 from Euboea, Greece, had somatic chromosomes  $2n = 20$  (Fig. 1: c, d). The chromosome number in Sicily is consistent with the report of RAIMONDO et al. (1983), while that from Euboea is consistent with TZANOUDAKIS' (1983) record. The difference in karyotype between the peony in Sardinia and W Greece on one side and that in Sicily and Euboea on the other is closely correlated with the differentiation of these two groups in external morphology, as shown below.

### Observation on external morphology

Most of the previous authors paid their attention to number of leaflets/segments and indumentum on the lower side of leaves and carpels, and we also consider them as sources of most significant diagnostic characters. The variation in number of leaflets/segments is shown in Table 1, from which it is clear that the character is variable in all the eleven sampled populations. However, the populations in Corsica, Sardinia, and Akarnania Province are significantly different from those in the other regions (except Ionian Islands) in this respect. In these regions among 74 sampled individuals 62 (83.8%) have nine leaflets and 12 have 10–20 leaflets/segments. Within populations the individuals with nine leaflets take up from 92% in H01016 from Sardinia to 75% in H01013 from Corsica (Table 1). Among 56 herbarium specimens from Ionian Islands 45 (80%) have nine leaflets/segments. On the

Table 2

Characters and coding (in parentheses) used in the variate analysis of *P. mascula/corsica* group

1. Number of leaflets/segments of lower leaves; 2. Type of indumentum on the lower surface of leaflets/segments: absent (0), holosericeous (1), hispid (2); 3. Density of the indumentum: glabrous (0), very sparsely hairy (1), sparsely (2), moderately (3), densely (4), so densely as totally covering surface (5); 4. Maximum length of leaflets/segments; 5. length/width of leaflets/segments; 6. Petal colour: pink-red (1), white or white with pink base or periphery (2); 7. Number of carpels; 8. Type of indumentum on carpels: absent (0), 1.5 mm long (1), 3.0 mm long (2); 9. Density of indumentum on carpels: 0,1,2,3,4,5, coding the same as for indumentum on leaflets/segment
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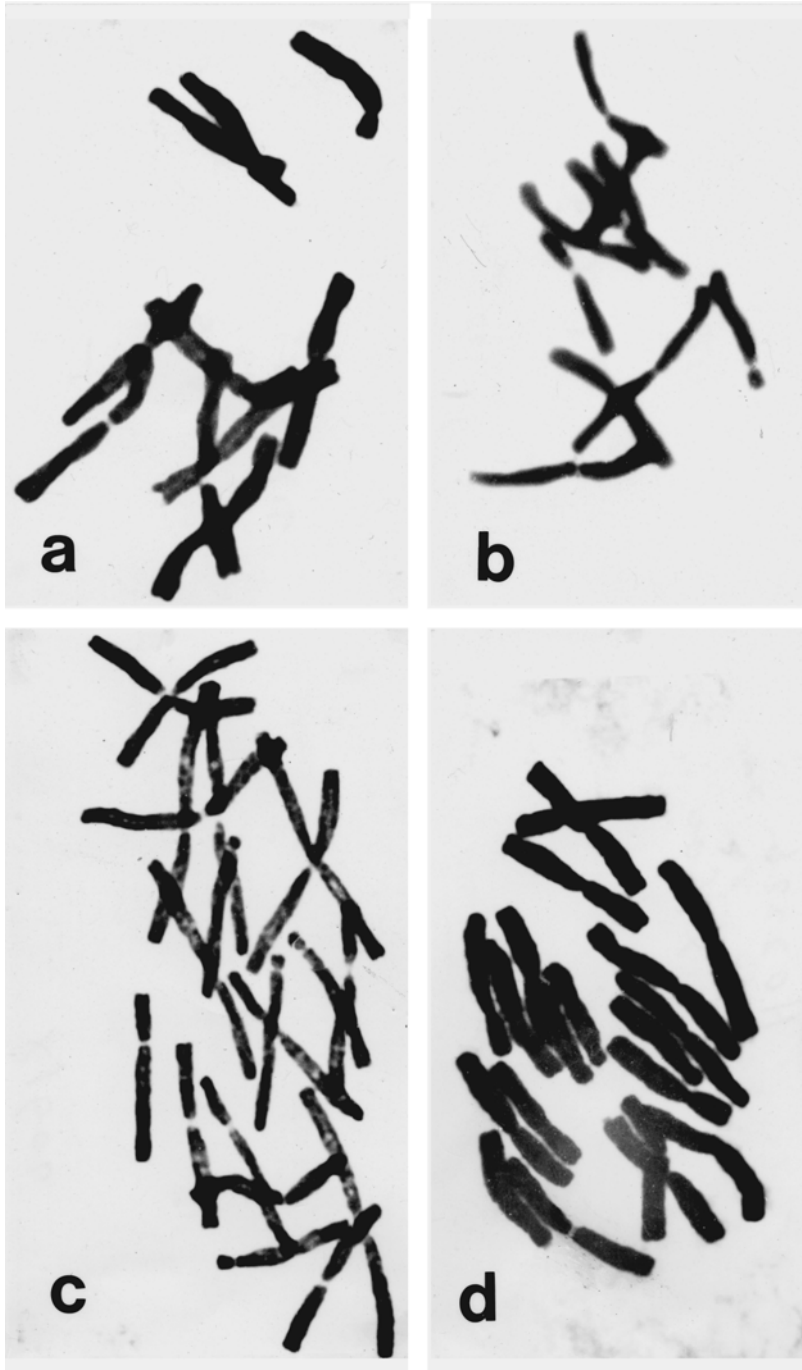


Fig. 1

Chromosomes of four populations in two species

**a** — H01018 (*Paeonia corsica*); **b** — H02225 (*P. corsica*); **c** — H021020 (*P. mascula* subsp. *russoi*); **d** — H02226 (*P. mascula* subsp. *hellenica*)

contrary, out of 54 sampled individuals from the other regions only three (5.5%) (one in H01020 and two in H02226) have nine leaflets, while all the others are of 10–20 leaflets/segments. Only one of eight herbarium specimens from Sicily possesses nine leaflets, whereas all the others have 10–15 leaflets/segments. That is to say, the vast majority of individuals in Corsica, Sardinia, and Ionian Islands and Akarnania Province have nine leaflets, whereas those in the other regions have 10 or more leaflets/segments.

For convenience of discussion, we designate the peony in Corsica, Sardinia, Ionian Islands and Akarnania as form “A”, while that in the other regions as form “B”. The number of leaflets/segments is correlated with the indumentum on the lower surface of leaves. Most individuals of “A” have their leaves rather densely hairy on the lower surface, but individuals with sparse indumentum or even entirely glabrous were not very rare, particularly in the population H01015 from Mt. Cagna, Corsica, where out of 13 individuals nine have leaves entirely glabrous. On the contrary, a high percentage of individuals of “B” (25 of 54) are glabrous on the lower surface of leaves and more individuals (29 of 48) are rather sparsely or even so sparsely hairy that we could hardly find some hairs only along major veins (Table 1). “A” differs from “B” also in type of hairs on leaves (CESCA et al. 2001). “A” possesses soft and bent hairs, which are called holosericeous here, whereas “B” has nearly straight hairs, which are called hispid (Table 1).

Carpels in all the populations sampled are similar in number, varying from 1 to 8, with 2–4 most frequently found. However, the indumentum on carpels shows a distinct differentiation between “A” and “B”. Hairs on carpels of “A” are much shorter (1.5 mm long) than those of “B” (3.0 mm long) (Table 1). Probably because of the difference in hair length, the carpels of “A” appear not entirely covered with hairs even when young, whereas those of “B” are totally covered with hairs even when nearly mature (Fig. 2).

Within the form “B” region a great majority of specimens from Sicily (34 of 40) are hispid on the lower surface of leaves, whereas those from France mainland (4/12), Italy mainland (8/10) and the Aegean Islands (11/16) are

mostly (23/38) glabrous or very sparsely hispid beneath. Thus, the peony from Sicily is different from that in France, Italy and the Aegean Islands in indumentum of leaves (Table 1). For the peony in France, Italy and the Aegean Islands we also found the difference in petal colour. The petals are always red or rose in France and Italy, while mostly white or white with pink shade at the base or periphery, less frequently (10%) red or rose in the Aegean Islands (Table 1).

### Statistical analysis

The results of Cluster Analysis and Principal Coordinate Analysis are shown in Fig. 3 and Fig. 4 respectively. The figure 3 shows that all the individuals from Corsica (CO), Sardinia (SA), Ionian Islands and Akarnania Province (IA) (except one from Corsica) (form “A”) form a branch (“A” branch), which is clearly separated from “B” branch formed from all the individuals from France and Italy (FI), Sicily (SI), and Aegean Islands (AE). The figure 4 shows that all the individuals in form “A” gather together, forming a group clearly separated from those in form “B”. Therefore, the results of both Cluster Analysis and Principal Coordinate Analysis (Fig. 3; Fig. 4) demonstrate that the peonies in Corsica, Sardinia, Ionian Islands and Akarnania Province is a natural group, which differs distinctly from those in the other regions.

Within the “B” branch (Fig. 3) we can see some differentiation among regions; three sub-groups (FI, SI and AE) can be detected. However, the differentiation is not so clear as that between “A” and “B”, because some individuals in one region (FI) gather together with the individuals in the other region (SI). The figure 4 shows the same result.

### Discussion and conclusions

#### Division of the peony in the region under study

As we stated in “observations on external morphology”, the peonies in Corsica, Sardinia, Ionian Islands and Akarnania Province (form “A”) differ from those in the other regions under study (form “B”) in having leaflets/segments mostly nine (vs mostly 10–20),

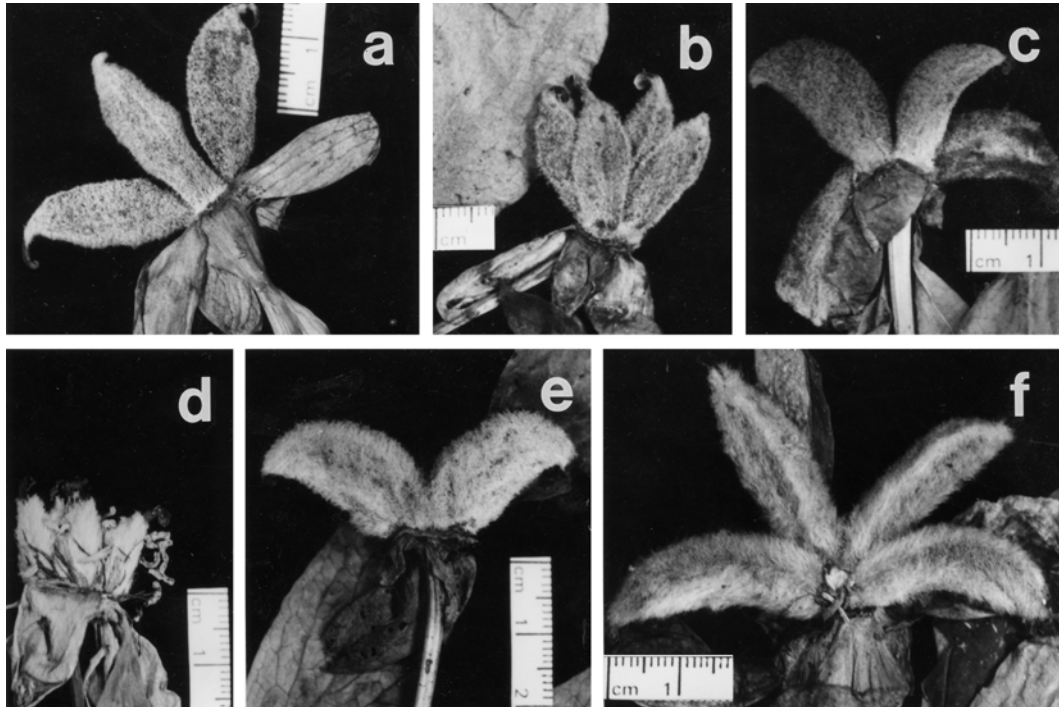


Fig. 2

Photographies of carpels showing two types of indumentum

**a** — H01014 (Corsica, France); **b** — H01018 (Sardinia, Italy); **c** — H02225 (Akarnania Province of Greece); **d** — H01004 (Clermont-Ferrand, France); **e** — H021023 (Potenza, Italy); **f** — H021020 (Sicily, Italy)

**a–c** 1.5 mm long; **d–f** 3 mm long

hairs on carpels 1.5 mm long (vs 3 mm) and the lower surface of leaves mostly densely, rarely sparsely, holosericeous, very occasionally glabrous (vs glabrous or very sparsely hispid). Both figure 3 and figure 4 show that form “A” is distinct from form “B”. Therefore, two distinct groups are readily recognized. These two groups are differentiated not only in external morphology, but also in chromosomal number,  $2n = 10$  in form “A”, while  $2n = 20$  in form “B”.

As shown in figure 4, within the form “B” two subgroups could be recognized; the peonies from France and Italy (FI) ( $B_1$ ) are separated from those from Sicily (SI) and Euboea and Andros (AE) ( $B_2$ ). The two subgroups are different from each other mainly in petal colour, rose or red in the former, while mostly white in the latter. As shown in Fig. 3 and Fig. 4, the peonies ( $B_2$ ) from Sicily and those

from the two islands in Greece are intermingled and can not be distinguished from each other.

#### Polymorphic but monotypic in Corsica and Sardinia together

The individuals with glabrous carpels of “A” have been treated as a form (ROUY & FOUCAUD 1893), as a variety with different names (COSSON 1850, 1887; HUTH, 1891; FIORI 1898; LEGRAND 1899; GÜRKE 1903; BRIQUET 1910; ASCHERSON & GRAEBNER 1923; STERN 1946), as a subspecies (SCHMITT 1997), or as a species: *P. corsica* (TAUSCH 1828) or *P. coriacea* BOISS. (ZANGHERI 1976); PIGNATTI 1982; AKEROYD, 1993). We also found this kind of individuals in Corsica and sampled a population (H01015, Table 3). Three of eight individuals in the population had glabrous carpels. It is clear from Table 3 that the character of glabrous carpels is not correlated with any other.

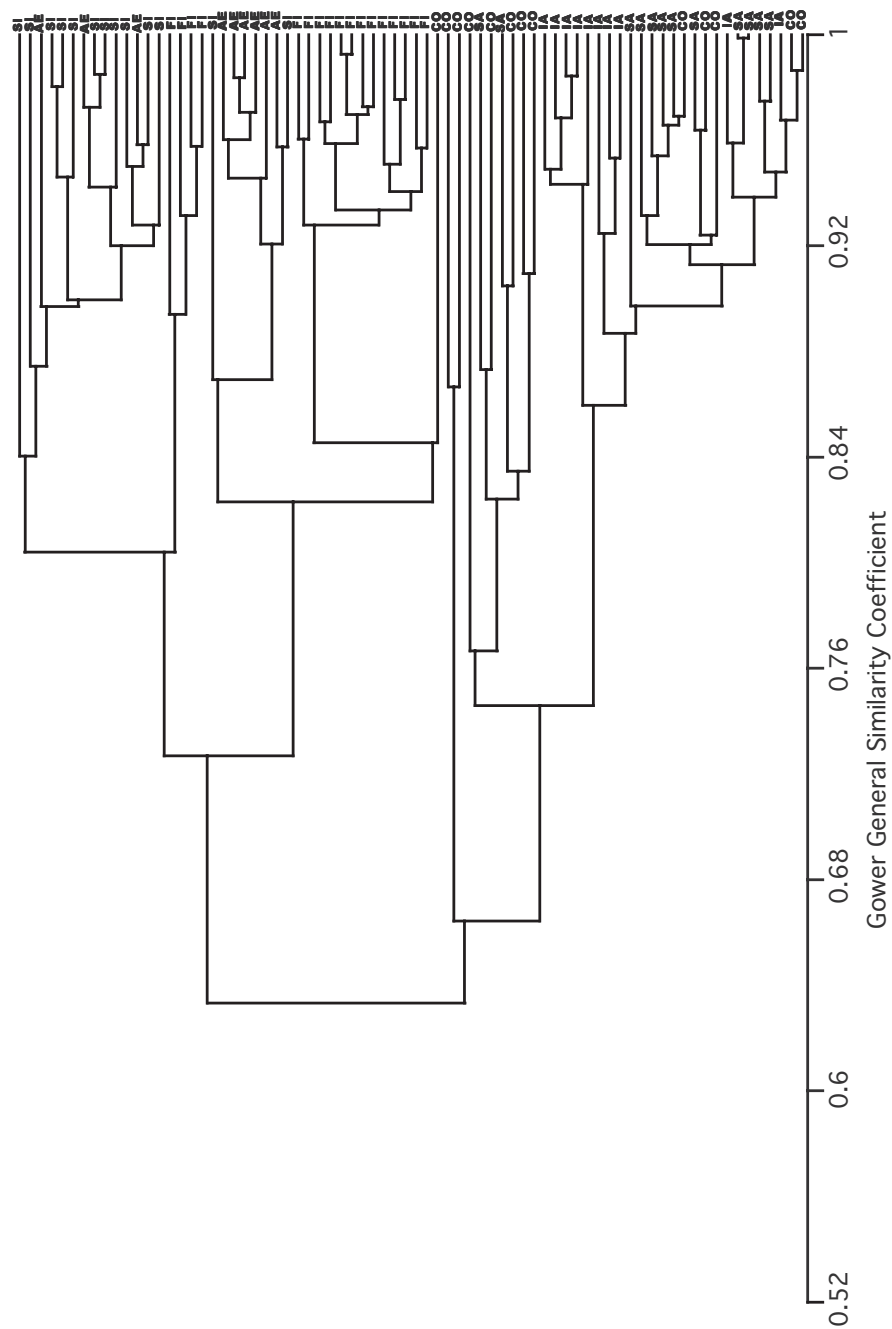


Fig. 3  
Cluster Analysis (UPGMA). OTUs and characters used are explained and described in the text and Table 2  
CO — the populations H01013, H01014, H01015 and herbarium specimens from Corsica, France; SA — the populations H01016, H01018 and herbarium specimens from Sardinia, Italy; IA — H02225 and herbarium specimens from Akarnania and Ionian Islands; FI — the populations H01004, H01023 and herbarium specimens from France and Italy; SI — the populations H01019, H01020 and herbarium specimens from Sicily, Italy; AE — the populations H02226 and herbarium specimens from Euboea, Aegean region, Greece

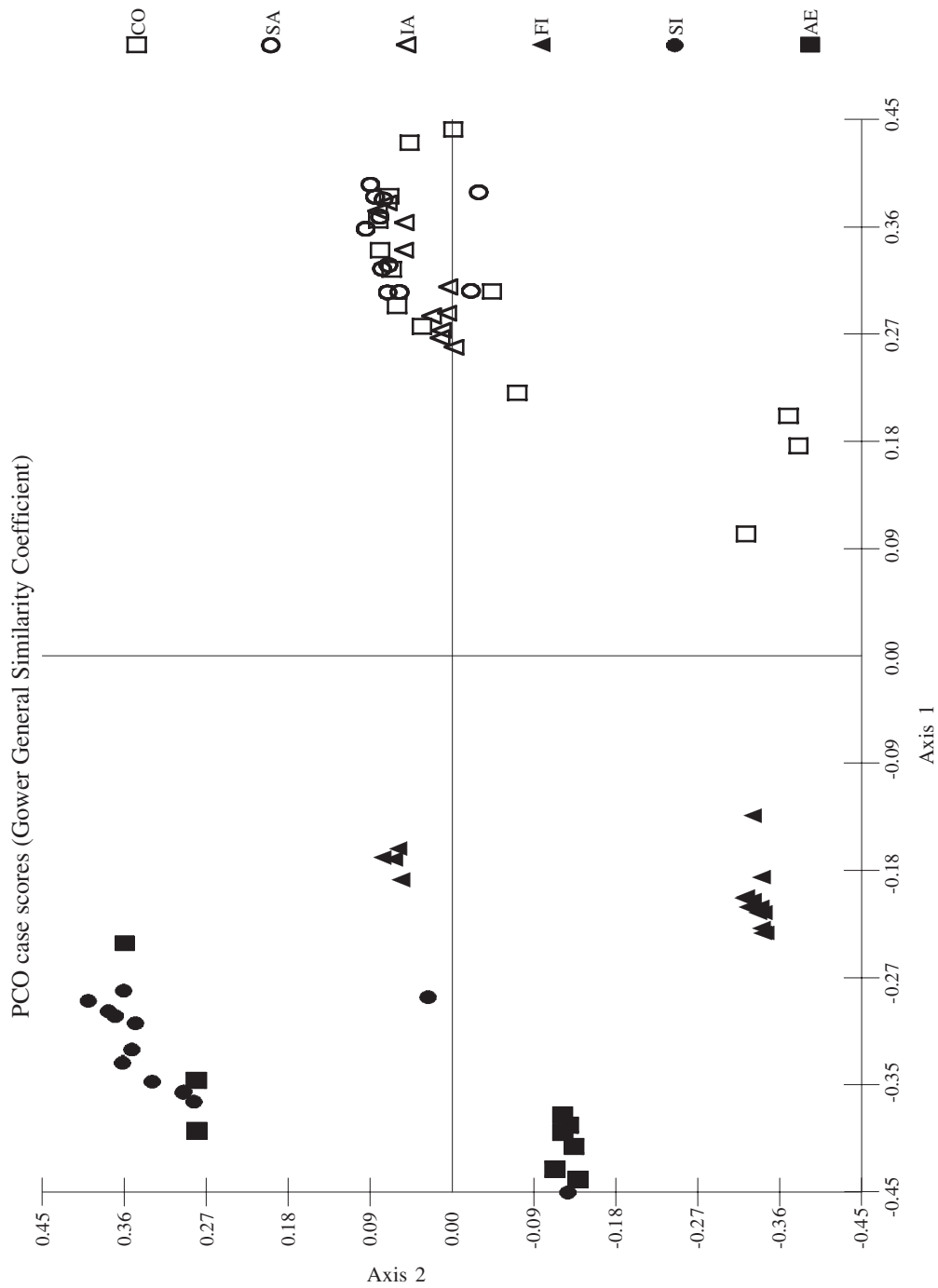


Fig. 4  
Principal Coordinate Analysis. OTUs and characters used are the same as for Fig. 3. For abbreviations see Fig. 3

Table 3

Polymorphic characters in the population H01015 (Corsica, Mt. Cagna)  
(the vouchers in A, CAS, K, MO, PE, UPA)

Individuals	Stem colour	Number of leaflets/ segments of lower leaves	Indumentum on lower side of leaves (density grade <sup>1</sup> )	Carpel number	Indumentum (density grade <sup>1</sup> )
1	green, purple below	20	0	1	0
2	green	9	0	2	0
3	green (petioles purple)	9	2	3	4
4	green	9	0	3	4
5	green	9	0	3	4
6	green, purple below	9	2	4	4
7	green, partially purple	9	0	5	0
8	green, purple below	9	0	3	4
9		13	0		
10		10	2		
11		9	0		
12		9	3		
13		9	0		
14		9	0		

<sup>1</sup> See text for how to determine the density grade

In addition, *REVERCHON 218* was collected from Serra di Scopamene, S Corsica, twice on June 2 and 4, 1879. In P there are eight sheets with eleven flowers, of which eight are of visible carpels. All of them are of nine to 18 leaflets/segments, which are all rather densely holosericeous beneath. Four of the eight have two or three entirely glabrous carpels, while the rest four have three or five seemingly glabrous carpels which are actually of several hairs along the sutures. *REVERCHON 291* was collected from Mt. Limbardo, N Sardinia, twice in May and July of 1882, and has a number of duplicates in the herbaria E, K, P and WU. One sheet in K is of two individuals, one (collected in May) with three tomentose carpels and the other (July) with four glabrous carpels, but their leaflets are both nine and holosericeous; the two individuals in E both have three tomentose carpels and nine holosericeous leaflets, and the two in WU have five tomentose carpels and holosericeous leaflets. There are four sheets in P, among which leaflets/segments varies from nine to 11 in number, are all rather densely holosericeous beneath. One sheet possesses two carpels densely tomentose, another one very

sparsely hairy near the styles and along the sutures, while the rest two are of entirely glabrous carpels. Therefore, *REVERCHON*'s two collections show that the number of leaflets/segments and presence or absence of indumentum on the lower surface of leaves and on carpels were variable within populations. The fact that some sheets "possess *mascula*-like fruits", while the others "have *coriacea*-like fruits" has caused some difficulties in taxonomy, as stated by CULLEN & HEYWOOD (1964a), who even doubted whether *REVERCHON*'s collection (218) came from the same place. However, our field observation in Corsica and Sardinia, and our collection *H01015* (Table 1) are consistent with his collections, and also show that these characters are not correlated with each other or with any other character. Therefore, the indumentum on carpels in Corsica and Sardinia is a polymorphic character and "carpel glabrous" is just one of polymorphic states, and thus any taxonomic recognition of this state is unjustifiable. The peony in Corsica and Sardinia together forms a single entity, which occurs also in Ionian Islands and the adjacent mainland.

CULLEN & HEYWOOD (1964) mentioned “*coriacea*-like fruits” in Sardinia, and suspected the presence of *P. coriacea* in Corsica and Sardinia. ZANGHERI (1976), PIGNATTI (1982), AKEROYD (1993) and SCHMITT (1997) identified the peony with “*coriacea*-like fruits” in Corsica and Sardinia as *P. coriacea*. As shown in Table 1, Table 3, Fig. 3 and Fig. 4, “*coriacea*-like fruits” is one of polymorphic character states of carpels; the peony in Corsica and Sardinia forms a single entity and is inseparable. Like the peony in Corsica and Sardinia, the population of *P. coriacea* in Sierra de Alfacer, Granada, Spain, was polymorphic in indumentum of carpels. The great majority of individuals had glabrous carpels, but two sheets of one collection (AEDO, MUÑOZ-GARMENDIA & NAVARRO CN-520) in the herbarium MA both had carpels very sparsely hispid or so sparsely hispid that except disc (sparsely hispid) we could hardly find some hairs on carpels themselves. MUÑOZ-GARMENDIA & NAVARRO (1993) identified this collection as *P. coriacea* with question. We agree with their identification, because such a polymorphism in indumentum of carpels are rather common in the genus *Paeonia*, e.g. *P. lactiflora*, *P. emodi*, *P. anomala* subsp. *veitchii*, *P. intermedia*. Furthermore, the hairs on the carpels of Spanish population were 2 mm long, while those of Corsica and Sardinia populations were 1.5 mm long. We did not find a single population purely with glabrous carpels in Corsica and Sardinia.

#### Monotypic in Sicily

The peony in Sicily is not so polymorphic as the form “A”. As shown in Table 1, the populations H01019 (Mt. Pizzuta) and H021020 (Mt. Carbonara) are rather similar in any respect, and they are similar to the herbarium specimens examined from Sicily. No significant differentiation has been detected among them. The protologue of *Paeonia russoi* BIV. (BIVONA-BERNARDI 1816) described “petala 5–6, obovata, chermisina”. However, later observations showed a different result. C. W. MULLER 4 (K) has a note “flowers white, fringed with red”; DAVIS & SUTTON 63835 (BM) “petals 6–7, ivory white”, and Dr. A. Fridlender gave us a photograph of a peony from Sicily, which also

has white petals. When we visited the mountains Pizzuta and Carbonara of Sicily in early June, 2001, the flowering time was over, unfortunately. From petal remains and undeveloped flower buds in H01020 they seemed to be all white, but at least one petal remains showed white with red base. The situation in Sicily may be the same as that on the mountain Ochi, Euboea, Greece (H02226), where 90% of flowers were white, and remaining 10% were red (TZANOUDAKIS, pers. comm.); two individuals were introduced by us in 2002 into the Beijing Botanic Garden, Chinese Academy of Sciences, and they both showed in 2003 petals white but pink at the base and periphery. Therefore, it seems to us that flowers of *P. mascula* subsp. *russoi* in Sicily varied in colour from white, white but pink at the base or periphery to pink.

#### Conclusions

It seems justified to make following conclusions from the above analysis: 1) The populations in Corsica and Sardinia are extremely polymorphic, particularly within the population H01015 in Mt. Cagna, Corsica, but they are monotypic, forming a single entity; 2) The peony in Corsica, Sardinia, Ionian Islands and Akarnania Province is distinctly different from those in the other regions, and should be recognized as an independent species; 3) The peony in Sicily is monotypic, and is of only one entity; 4) The peony in Corsica, Sardinia, Ionian Islands and Akarnania Province is a diploid ( $2n = 10$ ), while all the members of *P. mascula* are tetraploid ( $2n = 20$ ) according to the reports so far available on chromosomes (Table 1). Thus, the diploid and tetraploid are closely correlated with the differentiation of external morphology, and they are distinctly different in morphology.

#### Taxonomic treatment

Four specific names have been given to the peony with the type specimens from Corsica and Sardinia, *P. corsica* SIEBER ex TAUSCH (1828), *P. revelieri* JORD. (1903), *P. glabrescens* JORD. (1903), and *P. morisii* CESCA, BERNARDO & PASSALACQUA (2001). Besides, three additional specific names were used for this peony, *P. cambessedesii* (WILLK.) WILLK.

by HUTH (1891) (as variety), *P. triternata* PALL. ex DC. by ROUY & FOUCAUD (1893) (as variety), and *P. coriacea* BOISS. by ZANGHERI (1976), PIGNATTI (1982) and AKEROYD (1993) (as species), and by SCHMITT (1997) (as subspecies). *P. cambessedesii* is always entirely glabrous, with the number of carpels varying from four to eight, very rarely less. It is a distinct species confined to the Balears, Spain. The type of *P. triternata* PALL. ex DC. (= *P. daurica* ANDREWS) is from Crimea, Ukraine, and it is distributed around the Black Sea. Its leaflets are undulate and obovate, and its carpels are covered with long hairs (3.0 mm long). Some individuals within the populations in Corsica and Sardinia, e.g. *H01015* and *H01018*, have “*coriacea*-like fruits”, and were thus identified as *P. coriacea*. However, *coriacea*-like (glabrous) follicles are not correlated with any other character, and are just one of polymorphic character states of the peony in Corsica and Sardinia, as mentioned in “Discussion”, and these individuals differ distinctly from *P. coriacea* (see the following key). Therefore, it is clear that the valid name for the peony in Corsica, Sardinia, and Ionian Islands

and Akarnania Province (form A) is *P. corsica* SIEBER ex TAUSCH, whose type is from Mt. Cagna, Corsica, where one of our collections, *H01015*, is from. As shown in Table 1 and Table 3, leaflets/segments in this population varies from nine to 20 in number, from glabrous, nearly glabrous to moderately densely holosericeous, and carpels varies from 1, 3, 4, to 5 in number, from glabrous to densely tomentose. The characters of carpels are not correlated with those of leaves. Thus, the type of *P. corsica* SIEBER ex TAUSCH is just one of combinations of polymorphic character states of the peony in Corsica, Sardinia, Ionian Islands and Akarnania (like the individuals No. 1, 2 and 7 in Table 3), and thus the peony in these regions should be identified as *P. corsica* SIEBER ex TAUSCH.

Although the peony in Corsica, Sardinia, Ionian Island and the adjacent mainland of Greece has been frequently confused with *P. mascula* (incl. *P. mascula* subsp. *russoi*), and sometimes with *P. cambessedesii* and *P. coriacea*, it can be distinguished rather clearly from the latter three, as shown in the following key.

- 1a. Plants entirely glabrous, very occasionally pubescent on lower surface of leaves; carpels glabrous, very occasionally hispid.
- 2a. Carpels mostly 4–8, very rarely less; leaves purple and always glabrous beneath, lower leaves always with nine or less entire leaflets (Balears) ( $2n = 10$ ) . . . . . *P. cambessedesii*
- 2b. Carpels mostly 2–4, less frequently 1 or more; leaves green-gray or purple, glabrous or holosericeous beneath, lower leaves with nine or more leaflets/segments.
  - 3a. Leaves glabrous, very occasionally pubescent beneath; lower leaves mostly with more than nine leaflets/segments; carpels 2, less frequently 3 or 4 (S Spain and Morocco) ( $2n = 20$ ) . . . . . *P. coriacea*
  - 3b. Leaves mostly holosericeous, rarely glabrous beneath; lower leaves mostly with 9 leaflets; carpels 1–5 ( $2n = 10$ ) . . . . . *P. corsica*
- 1b. Plants hairy, very occasionally glabrous; carpels tomentose.
  - 4a. Hairs on carpels 3 mm long, yellow-white; leaflets/segments mostly more than 9, very rarely 9 in number, glabrous or sparsely hispid beneath (Spain, France, Italy, Sicily, Greece to Iraq) ( $2n = 20$ ) . . . . . *P. mascula*
  - 4b. Hairs on carpels 1.5 mm long, brown-yellow; leaflets/segments mostly 9, rarely more in number, rather densely holosericeous, rarely glabrous beneath (Corsica, Sardinia, Ionian Islands and Akarnania Province) ( $2n = 10$ ) . . . . . *P. corsica*

*Paeonia corsica* SIEBER ex TAUSCH, Flora, 11: 88, 1828. Type: Corsica, “monte Cagna ad Porto vecchio in Corsica”, SIEBER s. n. (holotype, P! isotype, K!)

*Paeonia corallina* RETZ. var. *corsica* (SIEBER ex TAUSCH) COSS., Comp. Fl. Atlant. 2: 53. 1887.

*Paeonia corallina* RETZ. f. *corsica* (SIEBER ex TAUSCH) ROUY & FOUCAUD, Fl. France, 1: 144. 1893.

*Paeonia officinalis* L. subsp. *corallina* var. *corsica* (SIEBER ex TAUSCH) FIORI in FIORI & PAOLETTI (eds.): Fl. Italia, 1: 527. 1898.

- Paeonia mascula* (L.) MILL. var. *corsica* (SIEBER ex TAUSCH) GÜRKE in RICHTER (ed.): Pl. Eur. 401. 1903. ad pl. Corsica.
- Paeonia glabrescens* JORDAN in JORDAN & FOURREAU, Icon. Fl. Eur., 2: 38. t. 323. 1903. Type: JORDAN's, tab. cited.
- Paeonia revelieri* JORDAN in JORDAN & FOURREAU, Icon. Fl. Eur., 2: 38. t. 322. 1903. Type: JORDAN's, tab. cited.
- Paeonia morisii* CESCO, BERNARDO & PASSALACQUA, Webbia, 56(2): 229. 2001; PASSALACQUA & BERNARDO in Webbia, 59(2): 262. 2004. Syn. nov. Type: Sardinia: Nuoro, Gennargentu, Mt. D'Iscudu, 1300 m, 22. 06. 1996, L. BERNARDO & N. G. PASSALACQUA s. n. (holotype, CLU; isotypes, FI, PAL, SS).
- Paeonia russoi* auct. non BIV.: STERN, Stud. Gen. *Paeonia*, 63. 1946, p.p., quoad pl. Corsica and Sardinia.
- Paeonia russoi* BIV. var. *reverchonii* LEGRAND, Bull. Assoc. Franc. Bot., 2: 62. 1899. Type: Corsica: Serra di Scopamene, near Sartene, 04. 06. 1879, E. REVERCHON 218 (holotype, P! isotypes, BGUB! BM! F! G! K! M! P! WU!) (BGUB = University of Belgrad, Botanic Garden, Herbarium).
- Paeonia mascula* (L.) MILL. var. *russoi* (BIV.) GÜRKE in RICHTER (ed.): Pl. Eur., 401. 1903, p.p., quoad pl. Corsica and Sardinia.
- Paeonia mascula* subsp. *russoi* (BIV.) CULLEN & HEYWOOD, Feddes Repert., 69: 35. 1964, p.p., quoad pl. Corsica and Sardinia; TZANOUDAKIS, Cytotax. Stud. Gen. *Paeonia* in Greece, 30–35. 1977; STEARN & DAVIS, Peonies of Greece, 87–94. 1984.
- Paeonia corallina* f. *russoi* (BIV.) ROUY & FOUCAUD, Fl. France, 1: 144. 1893, p.p., quoad pl. Corsica.
- Paeonia corallina* var. *russoi* (BIV.) COSS., Comp. Fl. Atlant. 2: 53. 1887, p.p., quoad pl. Corsica and Sardinia.
- Paeonia officinalis* subsp. *corallina* var. *mascula* (L.) FIORI in FIORI & PAOLETTI (eds.): Fl. Italia, 527. 1898, p.p., quoad pl. Corsica and Sardinia.
- Paeonia mascula* var. *ovatifolia* (BOISS. & REUT.) GÜRKE in RICHTER (ed.): Pl. Eur., 401. 1903, p.p., quoad pl. Corsica.
- Paeonia corallina* f. *ovatifolia* (BOISS. & REUT.) ROUY & FOUCAUD, Fl. France, 1: 144. 1893, p.p., quoad pl. Corsica.
- Paeonia corallina* var. *broteroi* BOISS. & REUT. f. *ovatifolia* (BOISS. & REUT.) ASCH. & GRAEBN., Syn. Mitteleur. Fl., 5(2): 551. 1923, p.p., quoad pl. Corsica.
- Paeonia corallina* var. *pubescens* MORIS, Fl. sardoa, 1: 64. tab. 4. 1837. Type: Corsica: FORET DE PERTICATO, 1822, SOLEIROL s. n. (holotype: G!).
- Paeonia corallina* var. *pubescens* f. *hypoleuca* BRIQUET, Prodr. Fl. Corse, 1: 58. 1910. Type: Corsica: Cap Corse, Pointe de Gorfidoni, Mt. Fornello, 400–575 m, 27. 04. 1907, J. BRIQUET et al. s. n. (lectotype here designated: G!).
- Paeonia corallina* var. *russoi* f. *hypoleuca* (BRIQUET) ASCH. & GRAEBN., Syn. Mitteleur. Fl. 5(2): 551. 1923, p.p., quoad pl. Corsica and Sardinia.
- Paeonia corallina* var. *leiocarpa* COSS., Notes pl., Crit. 2: 50. 1850. = *Paeonia russoi* var. *leiocarpa* (COSS.) STERN, Roy. Hort. Soc. 68: 126. 1943. Type: Corsica, Mt. Cagna, 18. 07. 1849, L. KRALIK s. n. (holotype, P!).
- Paeonia corallina* var. *cambessedesii* auct. non WILLKOMM: HUTH, Bot. Jahrb. Syst., 14: 267, 1891, p.p., quoad pl. Corsica.
- Paeonia cambessedesii* auct. non WILLKOMM: BRIQUET, Prodr. Fl. Corse, 1: 58. 1910. (pro syn.).
- Paeonia corallina* var. *triternata* (PALL. ex DC.) BOISS., Fl. orient. 1: 97. 1867, p.p., quoad pl. Corsica.
- Paeonia corallina* f. *triternata* (PALL. ex DC.) ROUY & FOUCAUD, Fl. France, 1: 144, quoad nom., non PALL. ex DC.
- Paeonia officinalis* subsp. *corallina* var. *triternata* (PALL. ex DC.) FIORI in FIORI & PAOLETTI (eds.): Fl. Italia, 1: 527. 1898, quoad nom., non PALL. ex DC.
- Paeonia coriacea* auct. non BOISSIER: ZANGHERI, Fl. Italia, 1: 169. 1976, p.p., quoad pl. Corsica and Sardinia; PIGNATTI, Fl. Italia, 1: 343, 1982, p. p., quoad pl. Corsica and Sardinia; AKEROYD in TUTIN et al. (eds.): Fl. Eur. ed. 2. 1: 294. 1993, p.p., quoad pl. Corsica and Sardinia.
- Paeonia mascula* subsp. *coriacea* (BOISS.) MALAGARRIGA, sensu SCHMITT, Plantes Montagne, 12(181): 179. 1997, p.p., quoad pl. Corsica and Sardinia.

Perennials. Roots thickened, carrot-shaped, attenuate downwards, tap roots up to 2 cm in diameter, grey-brown. Stems with 5–7 scales at the base, 35–80 cm tall, glabrous, green or green but partially purple, or nearly entirely purple. Petioles green, partially purple or entirely purple, glabrous or holosericeous; the lowermost one or two leaves biternate, with nine leaflets, leaflets rarely divided nearly to the base, thus leaflets and segments together mostly nine, less frequently 10, 11, very rarely more (up to 20); leaflets/segments ovate to elliptic, 4–13 cm long, 2–8 cm wide, base cuneate to nearly truncate, apex acute, always glabrous above, but mostly rather densely, less frequently sparsely holosericeous, rarely glabrous beneath. Involucrate bracts absent or 1–3, foliate. Sepals 1–8, but mostly 2–5 in number, unequal in size, green or green but purple at periphery to entirely purple, ovate-orbicular, apex rounded or mucronate. Petals rose, 7–8 in number, obovate. Stamens numerous; filaments purple; anthers yellow. Disc 1 mm high, wave-dentate, tomentose on flowers with tomentose carpels. Carpels 1–8, but mostly 2–5, green, purple or red, tomentose, with hairs 1.5 mm long, brown-yellow, rarely glabrous, widest in middle-upper part; styles 1.5–3.0 mm long; stigmas red.

Chromosome number  $2n = 10$  (Fig. 1; CESCA et al. 2001; TZANOUDAKIS 1977, 1983).

*Paeonia corsica* SIEBER ex TAUSCH is characterized by mostly nine leaflets often rather densely holosericeous beneath and mostly short-tomentose carpels with the widest part above the middle, which distinguish it from the related species, *P. mascula*, *P. coriacea* and *P. cambessedesii*. The species is confined to Corsica, Sardinia, Ionian Islands and Akarnania (Fig. 4). It is found from 500 to 1700 m in altitude, in a variety of communities, oak and pine forests, maquis and in herbs, and with various media, limestones, granites and metamorphic rocks.

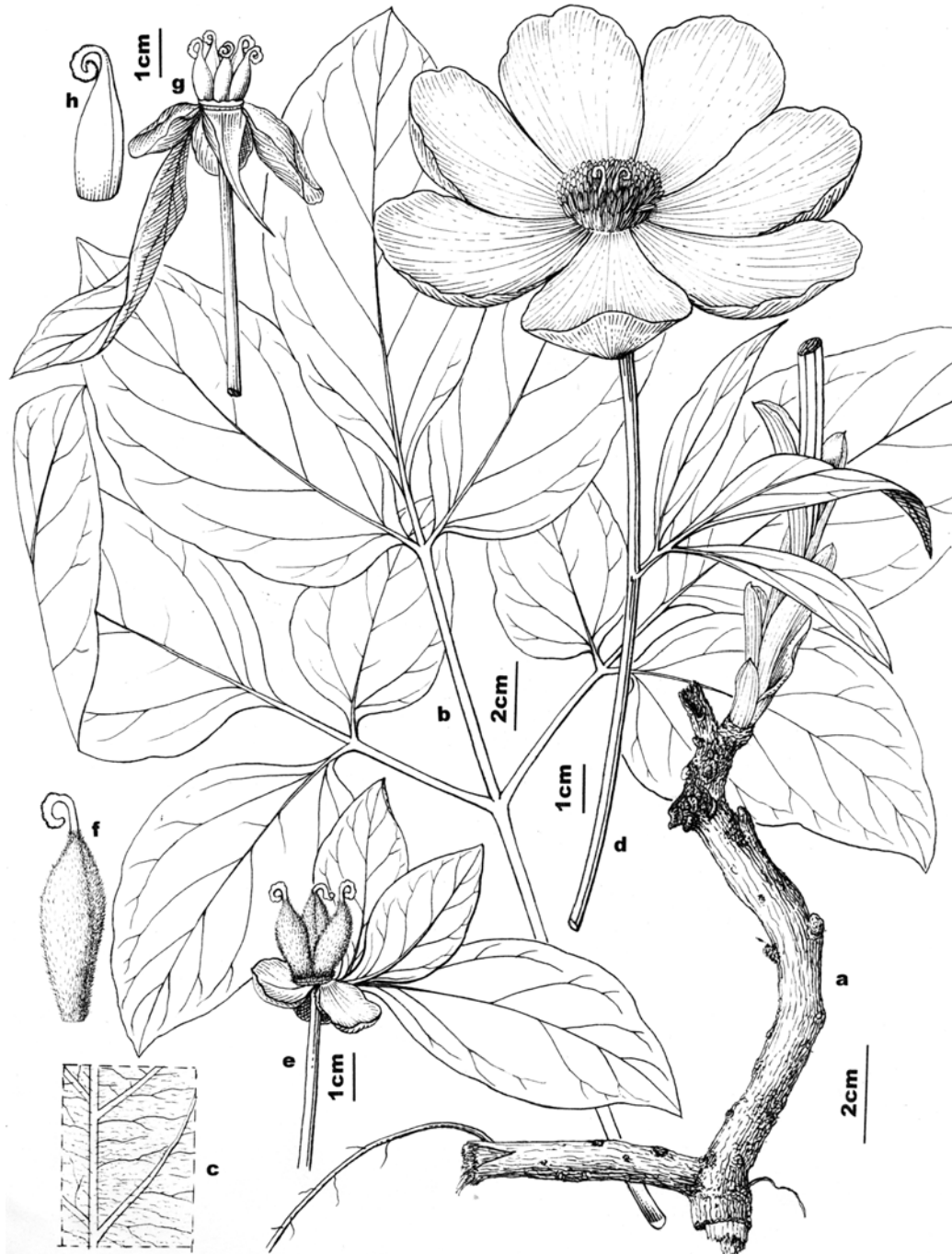
Additional specimens examined: **FRANCE.** **Corsica**, Mt. Cagna: between Punta di Compoletti and Punta di Litia, granite, 850–900 m, 31.05.2001, D. Y. HONG, X. Q. WANG & A. FRIDLENDER H01015 (A, CAS, K, MO, PE, UPA); loc. eodem, 13.07.1910, J. STEFANI s.n. (P); loc. eodem, 13.07.1911, J. STEFANI s.n. (W); loc. eodem, 05.1919, J. STEFANI s.n. (P); loc. eodem, 1200 m, 06.1917, P. COUSTURIER s.n. (K); loc. eodem, Bomfaris, 06.1918, P. COUSTURIER s.n. (G, P); loc. eodem, Bomfaris, 800 m, 05.1937, G. DESPLANTES s.n. (GZU, WU). Galeria: Capo dia Media, 930 m, among *Pteridium aquilinum*, 29.05.2001, D. Y. HONG, X. Q. WANG & A. FRIDLENDER H010134 (A, CAS, K, MO, PE, UPA); loc. eodem, Capo Manganello, 900 m, among *Pteridium aquilinum*, 29.05.2001, D. Y. HONG, X. Q. WANG & A. FRIDLENDER H01013 (A, MO, PE). Zonza: Rocailles, granite, 1100 m, 05.1937, G. DESPLANTES s.n. (B); Zonza, Lecceia, Rocailles, 05.1934, G. DESPLANTES s.n. (B); loc. eodem, 06.04.1879, P. TILLER s.n. (G). Olmi-Capella, 20.04.1866, C. DE MARSILLY s.n. (BM, G, K); Palasca Olmi-Capella, 700 m, 05.1917, P. COUSTURIER s.n. (G). Corte-Soveria, 1849, REQUIEN s.n. (G); loc. eodem, 22.04.1912, N. ROUX 545 (B, P); Corte, 02.05.1869, O. DEBEAUX s.n. (BM); Corte, 700 m, 05.05.1878, Ch. BURNOUF s.n. (WU). Vizzavone, 14.06.1917, C. I. FORSYTH-MAJOR s.n. (K). Foret de Perticato, 1822, REQUIEN s.n. (G); loc. eodem, 15.05.1869, SOLEIROL s.n. (G); loc. eodem, 06.1827, REQUIEN s.n. (K); loc. eodem, 07.1835, CARRIEN s.n. (G); near Levie, c. 450 m, 04.1933, D. ALICE & C. & E. GODMAN s.n. (BM); Serra di Scopamene, near Sartene, 02.06.1879, E. REVERCHON 218b (F, K, P, WU); Tavignano, 1843, BERNARD 80 (G); near Ajaccio, 1850, REQUIEN s.n. (G); s. loc., 1846, BERNARD 112 (G); s. loc., 06.1884, T. HUBLER s.n. (K); s. loc., 1866, P. MABILE 102 (P).

**GREECE.** **Etolia:** Akarnania Distr., Vonista/Xiromeros, Mts. Akarnanika, S of Komboti village, Boumistos summit, deciduous forest, 700–1000 m, 11.05.1974, E. STAMATIADOU 17845 (ATH); Akarnania, Skourtou, near a monastery, 450 m, along ridge, limestone, *Quercus* community, 26.05.2002, D. Y. HONG, D. M. ZHANG, X. Q. WANG & D. TZANOUDAKIS H02225 (A, K, MO, PE). **Kefallonia:** Kranea, Mt. Giupari, NNW slopes, limestones, Maquis and *Abies cephalonica* forest, 800–1000 m,

Fig. 5

*Paeonia corsica* SIEBER ex TAUSCH

**a** — the root and lower part of stem; **b** — a leaf; **c** — part of a leaflet enlarged to show hairs on the lower surface; **d** — a flower; **e**, a flower with young and tomentose follicles; **f** — a young and tomentose follicle in “e”; **g** — a flower with young and glabrous follicles; **h** — a young and glabrous follicle in “g”. Based on the collection from Mt. Cagna, Corsica, D. Y. HONG, X. Q. WANG & A. FRIDLENDER H01015 (the vouchers in A, CAS, K, MO, PE & UPA). Drawn by Miss Cai Shu-Qin



01. 04. 1982, *E. STAMATIADOU* 22668 (ATH); Mt. Enos, SW side of Roudhi summit, 700–800 m, between Maquis and *Abies cephalonica* forest, 29. 04. 1974, *E. STAMATIADOU* 17797 (ATH, BM); Mt. Enos, 01. 05. 1934, *F. GUIOL* 2368 (BM). **Lefkada:** Hortata, E side of the village, Strongilo, 900 m, rocky slopes with low shrubs, limestone, 16. 04. 1970, *E. STAMATIADOU* 8113 (ATH, BM); loc. eodem, ENE of the village, W rocky slopes with *Quercus coccifera*, *Crataegus* and *Phlomis fruticosa*, 20. 04. 1977, *E. STAMATIADOU* 19652 (ATH, BM). **Zakinthos:** Orthonies Village, S of Spileotis Monastery, 400 m, limestone, rocky fields with *Phryganea* and shrubs, 20. 03. 1976, *E. STAMATIADOU* 18809 (ATH, BM, E); loc. eodem, 450–500 m, 13. 03. 1971, *MERKATIS* 10980 (ATH, BM); Mt. Vrachionas, near Gyri Village, 600 m, 15. 05. 1974, *D. TZANOUDAKIS* 1365 (GZU); loc. eodem, 600 m, 01. 04. 1980, *M. YOUNG* H-627 (K).

**ITALY. Sardinia:** Mt. Limbardo, Arrondissement de Tempio, 16. 05. 1882, *E. REVERCHON* 291a (E, K, P, WU); loc. eodem, 14. 07. 1882, *E. REVERCHON* 291b (E, K, P, WU); Di Sassari, Fiorentinodictu Copiosa, 600–700 m, 10. 05. 1914, *A. FIORI* & *S. TIANA* s.n. (BM, K, RO); loc. eodem, 600–700 m, 24. 05. 1912, *A. FIORI* & *S. TIANA* 1853 (BM, K, RO, WU); Laconi, 09. 04. 1974, *M. NYDEGGER* s.n. (LD); Nuoro, above Oliena, mountain summit, limestone, 1230 m, 02. 06. 2001, *D. Y. HONG*, *X. Q. WANG* & *A. FRIDLENDER* H01016 (A, CAS, K, MO, PE); Mt. Oliena, 12. 05. 1884, *C. F. MAJOR* s.n. (WU); Nuoro, Barbagia, Mt. Arcueri, 950–1080 m, 03. 05. 1986, *J. POELT* & *CH. SCHEUER* s.n. (GZU); Nuoro, Mt. Strabe, c. 950 m, 22. 05. 1985, *P. L. NIMI* & *J. POELT* s.n. (GZU); Nuoro, Gennargentu Range, Mt. Tonneri, limestone, 950–1000 m, 03. 06. 2001, *D. Y. HONG*, *X. Q. WANG* & *A. FRIDLENDER* H01018 (A, CAS, K, MO, PE, UPA); Nuoro, Mt. Gennargentu, 1570–1700 m, 27. 05. 1983, *A. CHARPIN* et al. AC 17795 (E, G); near Pula, 04. 1928, *U. I. MÜLLER* s. n. (E, G, K); Central Sardinia, 03. 07. 1971, *G. DUNFORD* & *E. G. MOYES* 137 (BM); loc. eodem, 1830, *MORIS* s.n. (G); loc. eodem, 1839, *MORIS* s.n. (G).

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