

## Archaeobotany of capers (*Capparis*) (Capparaceae)

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Received June 3, 2002 / Accepted October 8, 2002

**Abstract.** The origins of capers, their use and cultivation are discussed. Capers seeds and charcoal are often recovered from archaeological sites of the Mediterranean and West Asia. These are referred to as *C. spinosa* L. This is mostly a group of cultivars restricted to localities surrounding the Western Mediterranean and some places in the Eastern Mediterranean. Identification of the findings is discussed in terms of seed morphology, present distribution and ancient uses of *C. aegyptia* Lam., *C. sicula* Veill., *C. cartilaginea* Decne, *C. orientalis* Veill., *C. decidua* (Forssk.) Edgew. and other species. Citations of *Capparis* in early Rabbinic, Mesopotamian and Greco-Roman texts are presented.

**Keywords:** Plant domestication – Foods – Mediterranean – Medicinal plants – Near East – Spices – Written evidence

### Introduction

Commercial capers are the immature flower buds of *Capparis* spp. that have been pickled in vinegar or preserved in granular salt. Semi-mature fruits and young shoots with small leaves may also be pickled for use as a condiment. The use of capers can be traced to ancient civilisations. Currently it is centred around the Mediterranean and based on the exploitation of wild *C. sicula* populations and cultivation of *C. spinosa* and *C. orientalis* (Inocencio et al. 2000, 2002). Capers seeds and charcoal are often recovered from archaeological contexts of the Mediterranean and West Asia. These are referred to as *C. spinosa* or *Capparis* sp. (see below).

The present paper grew out of the taxonomic revision of *Capparis* subgenus *Capparis* and subsequent studies on its traditional and present commercial uses (Inocencio 2001; Inocencio et al. 2000, 2002). This led us to conclude that *C. spinosa* is a spontaneous hybrid between *C. orientalis* and *C. sicula*, both originating in wild populations of the parent species and in plantations of *C.*

*orientalis*. Therefore, although most *Capparis* findings in archaeological contexts of the Mediterranean and the Near East are referred to as *Capparis spinosa*, this species did not occur there. Instead, other species, wild or semi-domesticated, such as *C. aegyptia*, *C. orientalis* and *C. sicula*, the most common in the Mediterranean and Near East, have been collected for consumption or have even been cultivated locally. In this paper therefore the identification possibilities based on measurements and seed morphology of present day species are discussed. Further, a compilation of the archaeological finds in the Near East and the Mediterranean is presented and revised proposals for the archaeological determinations are made.

All *Capparis* species in the area considered here belong to *Capparis* subgenus *Capparis* except *C. decidua*. The species of subgenus *Capparis* growing in the Pacific, Australia, Madagascar, and SW Africa (*C. cordifolia*, *C. hereroensis*, *C. antanossarum*, *C. nummularia*) are not included. Neither are the species considered that belong to other subgenera occurring in Tropical Africa, Pakistan, India and other tropical areas of the Old World.

### Materials and methods

Archaeological and recent plant material from the different species of *Capparis* from Europe, the Mediterranean region and West Asia were compared.

Special collection trips were conducted in North Africa, West Asia and the Mediterranean to obtain fresh material for study. Voucher specimens were deposited in the herbarium of Murcia University.

The herbaria and libraries of the following institutions were consulted, codes are as in Holmgren et al. (1990): (United States) JEPS, RSA; (Great Britain) OXF - Oxford, BM - Natural History Museum, K - Kew, E - Edinburgh; (Spain) MA - Real Jardín Botánico, MUB - Murcia; (France) P - Muséum National d'Histoire Naturelle. Specimens on loan were received from (United States) US - Smithsonian, BISH - Bishop Museum; (Great Britain) RNG - Reading University; (Denmark) C - Copenhagen; (Switzerland) G - Conservatoire et Jardin Botanique Geneva; (Belgium) BR - Brussels; (France) MARSSJ - Université de Marseille; (Turkey) HUB; (Israel) HUI - Hebrew University Jerusalem. Seeds from herbarium specimens were measured and studied at first hand (using an Olympus SZ binocular optical

microscope and a Jeol 6.100 SEM) as was archaeological material from the Iberian Peninsula (sites of Cueva Sagrada, Cueva Perneris, El Rincón de Almendricos) and Syria (site of Quara-Quzaq).

A bibliographical review was carried out in order to record the citations of *Capparis* from archaeological sites in Europe, the Mediterranean and West Asia. For authors of the mentioned species see Appendix 1.

## Results

### *The forms and dimensions of Capparis seeds and fruits*

Capers are represented in archaeological levels in form of carbonised seeds and, rarely, flower buds and fruits. Also occasional findings of dried seeds are known. Reports of *Capparis* charcoal are probably linked to the use of the stems of *Capparis decidua* as this quick-burning wood is used as fuel and occasionally for timber; it is hard, heavy, even-grained and tough and is used for making tool-handles, boat-knees etc. as it is resistant to termite attack. More rarely the branches of *C. zoharyi*, *C. parviflora* and *C. cartilaginea* are used as fuel. Most *Capparis* species of Western Asia and the Mediterranean are geophytes, the annual growth is not lignified and thus it is a poor, although locally abundant, fuel.

Capers plants are small trees or shrubs. The leaves are simple, entire, alternate, with well developed petioles. The stipules are spiny, of epidermal origin, not leafy, developed at the base of the petioles and are lacking or early falling in several species.

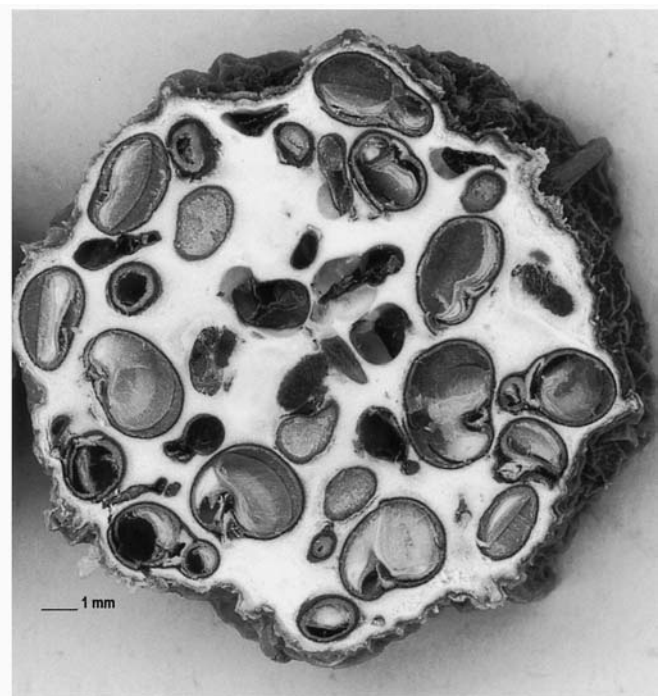
The flowers have a triangular nectary placed in the floral disk. A gynophore is present as an elongated structure produced by the proliferation of the floral axis. The ovary is ellipsoidal and unilocular placed at the end of the gynophore (Fig. 1). The fruit is a berry on a more or less vigorous stalk, obovate-oblong, ovoid to spherical or ellipsoid, green in colour with marked longitudinal nerves through which it splits. Seeds range from one to numerous, are usually dark brown upon ripening and immersed in a reddish or yellow pulp (Fig. 2). The seeds are globose, obovate or elliptical in outline, in side-view tapering from the top to the base (more or less wedge-shaped). The prominent curved radicle (Fig. 3) is a relevant feature for *C. zoharyi*, *C. sicula*, *C. parviflora* but it does not occur in others species such as *C. mucronifolia* and *C. cartilaginea* (Fig. 4). Sometimes only the "inner seed", reminiscent of chenopodiaceous seeds, has been preserved in archaeological contexts.

Seed coat morphology is characteristic but extremely homogeneous among species and therefore cannot be used as a taxonomic marker. The seed shows a "bee-hive" pattern of small foveolae (finely pitted) when the external coat (the outer cell layer of the testa) is missing (Fig. 3). This external coat presents a uniformly rough surface with very small protuberances and sometimes remains of the pulp (Fig. 5). Together both coats (= testa) are 0.1 mm thick and relatively fragile. Often some of the seeds are almost empty, especially in unripe fruits, but sometimes in those that are ripe, and therefore becoming extremely fragile (Fig. 2).

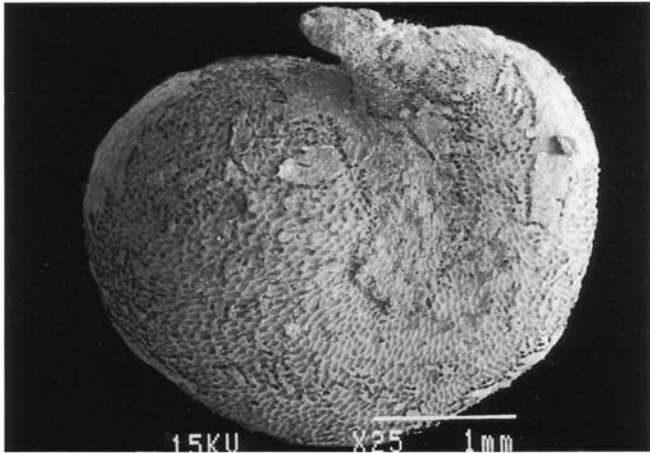
Seed dimensions are relatively uniform among species but still different enough to tentatively distinguish three groups (Table 1, Fig. 6)



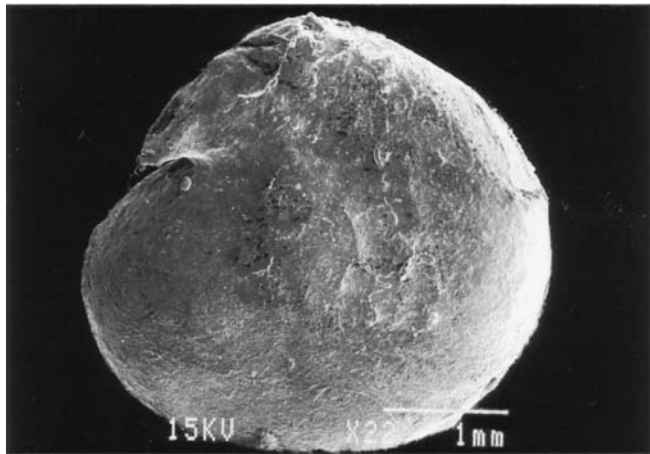
**Fig. 1.** Longitudinal section of *Capparis sicula* flower bud showing triangular nectary, stamens, gynophore, ovary, petals and sepal. The buds from this and other species are often consumed and carbonised remains are reported from Bronze Age Tell es-Sweyhat



**Fig. 2.** Transverse section of *Capparis sicula* immature fruit showing the seeds immersed in the white-yellowish pulp. At this stage the fruits are sometimes consumed brined. Also reported from Bronze Age Tell es-Sweyhat



**Fig. 3.** Seed morphology of *Capparis sicula* from SE Spain. SEM. The seed shows the prominent curved radicle and a "bee-hive" pattern of small foveolae (finely pitted) when the external coat is missing

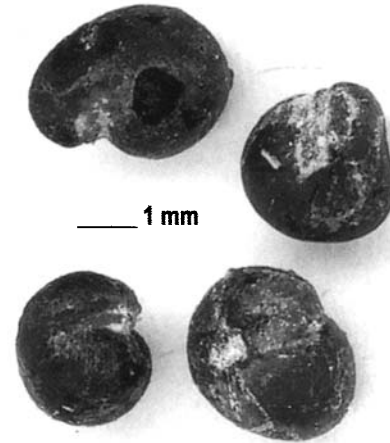


**Fig. 5.** Seed morphology of *Capparis zoharyi* from SE Spain. SEM. Large sized group. The external coat presents a uniformly rough surface with very small protuberances and remains of the pulp

1. Large sized: 3.5-4.5 x 2-2.7 x 3-3.7 mm, *C. decidua* (Fig. 7), *C. zoharyi* (Fig. 5), charred: 3.2-4.1 x 2-2.8 x 3-3.6 mm.
2. Medium sized: 3-3.5 x 1.8-2.5 x 2.1-3 mm, *C. sicula* ssp. *sicula* (Fig. 8), *C. sicula* ssp. *mesopotamica* (Fig. 9), *C. sicula* ssp. *herbacea* (Fig. 10), *C. spinosa*, *C. cartilaginea* (Fig. 4), *C. aegyptia*, *C. zoharyi*, *C. orientalis* (Fig. 11), *C. ovata*, *C. parviflora* ssp. *kurdica*, charred: 2.7-3.1 x 1.9-2.6 x 2.1-2.9 mm.
3. Small sized: 2-3 x 1.2-2 x 1.7-2.7 mm, *C. cartilaginea*, *C. atlantica*, *C. ovata* (Fig. 12), *C. mucronifolia* (Fig. 13), *C. napaulensis*, *C. sicula* ssp. *sindiana*, *C. parviflora* ssp. *parviflora*, *C. parviflora* ssp. *sphaerocarpa* (Fig. 14), charred: 1.8-2.7 x 1.2-2.2 x 1.7-2.6 mm.

Depending on their origin *Capparis cartilaginea* samples fall alternatively within the medium and small groups.

All the above groups are represented in the Mediterranean region and West Asia and are therefore likely to be found in archaeological contexts.



**Fig. 4.** Seeds of *Capparis cartilaginea* from Saudi Arabia, without the prominent radicle

## Discussion

### *Possibility of determination of capers in archaeological finds*

Determination of capers seeds in archaeological finds is relatively easy at the genus level as far as subgenus *Capparis* is involved, and provided the area considered is restricted to the Mediterranean, North Africa, West and Central Asia. The main problem starts when trying to identify the species. Seed morphology cannot be used for discrimination since reniform seeds are found in all taxa, although a few taxa also produce rounded seeds (Table 1). Measurements help to ascribe the samples tentatively to any one of the three groups here recognised, but overlapping dimensions make precise attribution difficult (Table 1, Fig. 6). Species such as *Capparis ovata*, *C. cartilaginea* and *C. zoharyi* display a wide range of dimensions that overlaps two groups (Table 1, Fig. 6). Combining the present geographical distribution of the different species and subspecies with seed dimensions can help in a tentative approach for identification, but the outcome remains uncertain. This latter method is used in proposing here the identification of the archaeological remains.

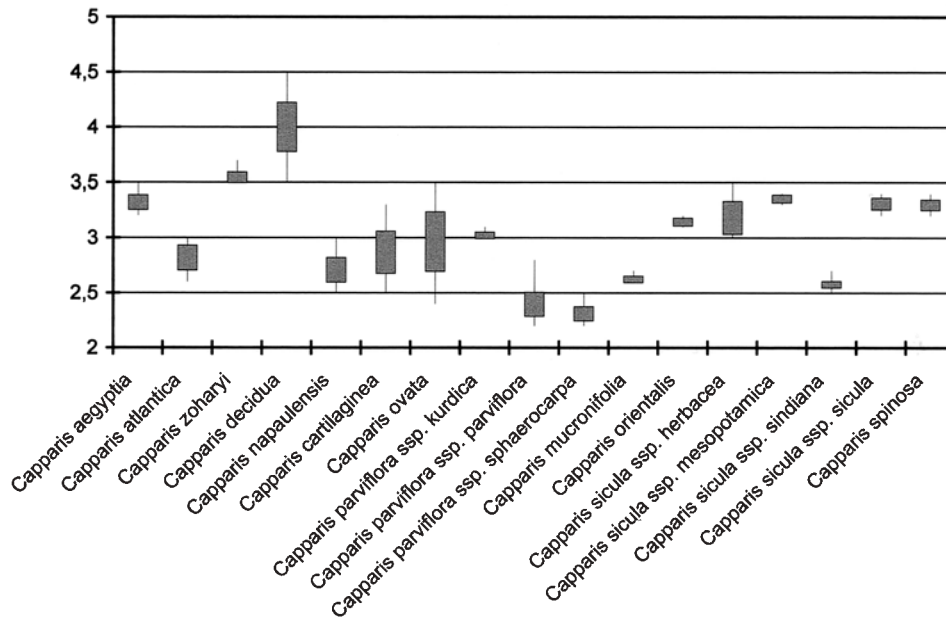
### *Species of Capparis in Mesopotamia and Syria: geographical distribution, archaeological finds and written sources*

Archaeological finds of capers seeds and fruits in Mesopotamia and Syria are summarised in Table 2 and Fig. 18.

Capers are still widespread in these regions today, even colonising the open areas and walls of archaeological sites such as Ebla or Ras Shamra. The dominant species in the south is *Capparis zoharyi* (*C. aegyptia* aucts.), its range overlapping that of *C. sicula* near Lattakia and in the north, where *C. zoharyi* becomes scarce. The Bedouins know the plants but rarely make use of them, although (as related by our Bedouin driver from Membij in September 1999) in the Sajur river area, Upper Euphrates region, they collect the flower buds for the Turks. We have studied several herbarium specimens reported as being collected

**Table 1.** Seed dimensions and morphology. Note: Seeds were studied in almost-ripe fruits in herbarium specimens, ten seeds per sample. From *C. sicula* ssp. *leucophylla* no seeds were available for measurement. In cases where there is a large variation in dimensions within one single species, representative samples of this variation have been included. Taxa are ascribed to the three groups (1 large, 2 medium, 3 small) according to dimensions. The overlap is displayed graphically in Fig. 6. For authors and synonyms see Appendix 1

Taxa	group	Length (mm)	m	sd	Width (mm)	m	sd	Depth (mm)	m	sd	L/W	L/D	Notes
<i>Capparis decidua</i>	1	3,5-4,5	4	0,3	2,2-2,5	2,32	0,13	3-3,7	3,28	0,27	1,6-1,9	1,1-1,3	Minutely foveolate, radicle slightly protruding, ellipsoidal
<i>Capparis aegyptia</i>	2	3,2-3,5	3,32	0,09	2,1-2,2	2,15	0,05	2,8-3	2,91	0,07	1,5-1,6	1,05-1,25	Minutely foveolate, radicle protruding, reniform to ellipsoidal
<i>Capparis zoharyi</i>	1,2	3,1-3,7	3,54	0,07	2,0-2,5	2,24	0,20	2,6-3,4	3,07	0,31	1,5-1,6	1-1,3	Minutely foveolate (inner large foveolae), radicle protruding, reniform to ellipsoidal
<i>Capparis atlantica</i>	3	2,6-3,0	2,82	0,15	1,2-1,5	1,35	0,09	2,4-2,5	2,43	0,05	2,0-2,2	1-1,2	Minutely foveolate, radicle protruding, reniform to ellipsoidal
<i>Capparis nappaulensis</i>	3	2,5-3,0	2,71	0,15	1,5-1,7	1,6	0,06	2,2-2,4	2,3	0,06	1,6-1,8	1,0-1,3	Minutely foveolate, radicle protruding, reniform to ellipsoidal
<i>Capparis cartilaginea</i>	2,3	2,5-3,3	2,87	0,26	1,8-2,2	2,01	0,12	2,4-2,7	2,55	0,08	1,2-1,6	1,0-1,1	Foveolate, radicle not protruding, reniform to rounded
<i>Capparis ovata</i>	2,3	2,4-3,5	2,97	0,36	1,5-2,1	1,78	0,22	2,4-2,7	2,54	0,08	1,6-1,7	1,0-1,2	Foveolate, radicle slightly protruding, reniform to ellipsoidal.
<i>Capparis parviflora</i> ssp. <i>kurdica</i>	2	3,0-3,1	3,02	0,04	1,6-1,8	1,7	0,06	2,1-2,2	2,16	0,05	1,7-1,8	1,3-1,5	Minutely foveolate, radicle protruding, reniform to ellipsoidal
<i>Capparis parviflora</i> ssp. <i>parviflora</i>	3	2,2-3,0	2,39	0,15	1,2-1,5	1,35	0,1	2,2-2,7	2,49	0,16	1,8-2,0	1,0-1,1	Minutely foveolate, radicle protruding, reniform to ellipsoidal
<i>Capparis parvi</i>	3	2,2-2,5	2,31	0,09	1,4-1,6	1,5	0,06	2,0-2,1	2,02	0,04	1,4-1,6	1,0-1,25	Minutely foveolate, radicle protruding, reniform to ellipsoidal
<i>flora</i> ssp. <i>sphaerocarpa</i>	3	2,6-2,7	2,62	0,04	1,5-1,7	1,59	0,05	2,0-2,5	2,28	0,15	1,6-1,8	1,0-1,3	Minutely foveolate, radicle not protruding, reniform to ellipsoidal
<i>Capparis mucronifolia</i>	3	2,6-2,7	2,62	0,04	1,5-1,7	1,59	0,05	2,0-2,5	2,28	0,15	1,6-1,8	1,0-1,3	Minutely foveolate, radicle not protruding, reniform to ellipsoidal
<i>Capparis orientalis</i>	2	3,1-3,2	3,14	0,05	1,5-1,8	1,67	0,09	2,3-2,7	2,5	0,12	1,7-2,0	1,1-1,4	Minutely foveolate, radicle slightly protruding, reniform to ellipsoidal
<i>Capparis sicula</i> ssp. <i>herbacea</i>	2	3,0-3,5	3,18	0,2	1,8-2,2	2,06	0,08	2,8-3	2,96	0,07	1,5-1,6	1-1,2	Minutely foveolate, radicle protruding, reniform to ellipsoidal
<i>Capparis sicula</i> ssp. <i>mesopotamica</i>	2	3,3-3,4	3,35	0,05	2,0-2,5	2,22	0,16	2,8-3	2,93	0,06	1,3-1,6	1,1-1,2	Minutely foveolate, radicle protruding, reniform to ellipsoidal
<i>Capparis sicula</i> ssp. <i>sindiana</i>	2	2,5-2,7	2,58	0,04	1,6-1,8	1,7	0,06	2,4-2,5	2,42	0,04	1,5-1,6	1,0-1,15	Minutely foveolate, radicle protruding, reniform to ellipsoidal
<i>Capparis sicula</i> ssp. <i>sicula</i>	2	3,2-3,4	3,31	0,07	1,6-2,1	1,87	0,16	2,2-2,8	2,51	0,19	1,6-2,0	1,2-1,5	Minutely foveolate, radicle slightly protruding, reniform to ellipsoidal
<i>Capparis spinosa</i>	2	3,2-3,4	3,29	0,07	1,8-2,0	1,94	0,07	2,6-2,8	2,7	0,06	1,7-1,8	1,1-1,3	Minutely foveolate, radicle protruding, reniform to ellipsoidal



**Fig. 6.** Seed morphology, variability of seed length among the different taxa and their overlap. Thin vertical bars show minimum to maximum value, thick bars show +/- quart. (0.025 and 0.975). Student's distribution, n = 10, Degrees of Freedom = 9,  $\alpha = 0.5$

**Table 2.** Finds of *Capparis* in archaeological contexts from Mesopotamia and Syria. Seeds are the type of plant remains reported unless otherwise stated in the column reference

Period	Site	Country	Reference	Proposed new Identification
<b>Upper Palaeolithic</b>				
Mesolithic	Tell Abu Hureyra	Syria	Hillman 1975	<i>C. zoharyi?</i>
Aceramic 9th-8th mill. B.C.	Tell Mureybit I-IV	Syria	van Zeist & Bakker-Heeres 1986a	<i>C. zoharyi?</i>
<b>Neolithic</b>				
PPNA, 7850-7750 B.C.	Jerf el Ahmar	Syria (north)	Willcox 1996; Kroll 2000	<i>C. sicula</i> ssp. <i>mesopotamica</i>
PPNB, 7650-7050 B.C.	Djade	Syria (north)	Willcox 1996	<i>C. sicula</i> ssp. <i>mesopotamica</i>
Early Hassunan, 6th mill. B.C.	Tell es Sawwan	Iraq (eastern)	Helbaek 1964; Helbaek 1970; Lisicyna 1983	<i>C. sicula</i> ssp. <i>mesopotamica</i>
PPNA, 6750-6050 B.C.	Halula	Syria (north)	Willcox 1996	<i>C. sicula</i> ssp. <i>mesopotamica</i>
PPN, 6000 B.C.	Tell es Sinn	Syria (eastern)	van Zeist 1980b	<i>C. aegyptia</i>
Neolithic	Tell Abu Hureyra	Syria	Hillman 1975	<i>C. aegyptia</i>
Neolithic	Umm Dabaghiyah	Iraq	Helbaek 1972a	<i>C. sicula</i> ssp. <i>leucophylla</i>
Samarran layers (ca. 5100 B.C.) 6500-5750 B.C. (with doubts of modern intrusion)	Choga Mami	Iraq	Helbaek 1972b; Renfrew 1987b	<i>C. sicula</i> ssp. <i>leucophylla</i>
8th-7th mill. B.C.	Ras Shamra	Syria (western)	van Zeist & Bakker-Heeres 1986b	<i>C. zoharyi</i>
	Aswad	Syria (Damascus basin)	van Zeist & Bakker-Heeres 1982	<i>C. zoharyi</i>
7th-6th mill. B.C.	Tell Bouqras	Syria	van Zeist & Waterbolk 1985	<i>C. zoharyi</i>
<b>Bronze Age</b>				
Early 3rd mill. B.C.	Tell Atij	Syria (north)	McCorriston 1995	<i>C. sicula</i> ssp. <i>mesopotamica</i>
Early 3rd mill. B.C.	Tell Qara-quzaq	Syria (north)	Matilla, Rivera & Obón 1994	<i>C. sicula</i> ssp. <i>mesopotamica</i>
Bronze	Selenkahiye	Syria	van Zeist & Bakker-Heeres 1988	<i>C. zoharyi</i>
Bronze	Tell es-Sweyhat	Syria	van Zeist & Bakker-Heeres 1988	<i>C. zoharyi</i>
EBA, ca. 2500-2000 B.C.	Tell Hamman et Turkman	Syria (north)	van Zeist & Waterbolk 1992; van Zeist, Waterbolk & Bottema 1988	<i>C. sicula</i> ssp. <i>mesopotamica</i>
<b>Iron Age</b>				
Assyrian	Nimrud	Iraq (upper Tigris)	Helbaek 1970; Renfrew 1987a	<i>C. sicula</i> ssp. <i>mesopotamica</i>
Nimrud VII and XVII 7th to 3rd cent. B.C.	Nimrud	Iraq (upper Tigris)	Helbaek 1966	<i>C. sicula</i> ssp. <i>mesopotamica</i>
Iron	Hama	Syria	Helbaek 1970; Renfrew 1987a	<i>C. zoharyi</i>
<b>Archaic</b>				
4th cent. B.C.	Mahmudiya	Iraq (southern)	van Zeist 1991b	<i>C. sicula</i> ssp. <i>mesopotamica</i>
<b>Medieval</b>				
Islamic beds	Bosra	Syria (southern)	Willcox 1992 (charcoal)	<i>C. aegyptia</i> or <i>C. zoharyi</i>

in the 19th century between Aleppo and Baghdad, or in the vicinity of Damascus, that actually belong to species that no longer grow there (e.g. *Capparis parviflora* Boiss under *C. heteracantha* DC, collected by Olivier). They presumably came from small populations. It is therefore possible that seeds of species at present rare in the area could similarly have been accidentally preserved in the antiquity.

In Syria capers findings are widely represented both geographically and in period, from the Lattakia seashore to the Eastern steppe. In the following paragraphs only the more relevant data are discussed, and some proposals for correct identifications are given. However, this is not always possible.

In aceramic levels of Mureybit 137 seeds were found, proceeding 101 from the 2nd phase (8200-8000 B.C.). This site is situated in northern Syria, near Meskene, about 85 km east of Aleppo (36°04'N, 38°11'E). Most of the seeds there had been more or less seriously damaged, resulting in the absence of parts of the outer and inner seed wall (van Zeist and Bakker-Heeres 1986a). The seeds are small and therefore could belong to Group 3 (Table 3), the problem being that none of the species in Group 3 now

grows in Syria. Therefore the specimens may correspond to an species now extinct in this area or to an ancestor, also extinct.

Based on present distribution the tentative identification of these remains is *C. zoharyi* although the seeds of this species fall within groups 1 or 2. But, as one colleague commented: "One can imagine, that with their bigger surface, large seeds may be broken (and thus unmeasurable) more often than small seeds from the same period; so 17 out of 137 from Mureybit may be at the small end of the range of what was originally there. Also, when only small sample sizes are available, one must ask the question: could it be that the seeds are small because they are immature, and had not yet reached their full size?"

In Neolithic Aswad I, Ib and II 25 seeds have been recovered (van Zeist and Bakker-Heeres 1979; 1982). Aswad is a site in the Damascus basin (Syria), 30 km southeast of Damascus (36°46'N, 38°58'E). Most probably the seeds belong to the small size group that is not present in Syria now (Table 4), or alternatively they may come from immature fruits of *C. zoharyi*.

Hundreds of capers seeds constitute the bulk of the plant remains of Early Hassunan Tell es Sawwan (the seeds are rounded and 2.5-3.0 mm in diameter) (Helbaek

**Table 3.** *Capparis* seed dimensions from aceramic Tell Mureybit (van Zeist and Bakker-Heeres 1986a)

Tell Mureybit	L (mm)	B (mm)
Maximum	2,80	2,40
Average	2,46	1,94
Minimum	1,90	1,60
n = 17		

**Table 4.** *Capparis* seed dimensions from Neolithic Aswad (van Zeist and Bakker-Heeres 1982)

Aswad	L (mm)	B (mm)
Maximum	2,80	2,40
Average	-	-
Minimum	2,20	2,20
n = 5		

1970, 1972b; Renfrew 1987a). Tell es Sawwan lies on the steppe at the edge of the Mesopotamian plain in Iraq, close to the Tigris bank (34°07'N, 43°55'E). The seeds could belong to the *Capparis sicula* aggregate.

In the Bronze Age Tell Quara-Quzaq, situated in the Mesopotamian plain, at an elevation of ca. 500 m on the Euphrates west bank, in northern Syria (36°36'N, 38°14'E), *Capparis* is present in silos 35, 53, 27, 78a and hearth 93. Only in well 35 there are two seeds of the size range 2.2 x 1.7 x 1.5 mm and 1.6 x 1.3 x 1 mm. In some cases the wall of the seed has greatly deteriorated through the action of fire (Table 5). The seeds could belong to the large and medium sized groups that are still present nearby (*C. sicula* and *C. zoharyi*). The small size group is not represented in Syria but these seeds could be from immature fruits.

Capers are documented in es-Sweyhat where unripe fruits and flower buds have been found in a jar (van Zeist and Bakker-Heeres 1988). The jar at Tell es-Sweyhat may point towards the established use of pickled capers in the Bronze Age. This does not imply that capers were cultivated in that period; even today most of the commercial capers come from wild plants (Inocencio et al. 2002).

According to Campbell-Thompson (1949) this plant was very important in Assyrian medicine; he cites the use of the seeds in the treatment of urinary incontinence. In the

**Table 5.** *Capparis* seed dimensions from Bronze Age Qara-Quzaq

Ref.	N	L	B	T
Qara-Quzaq, Silo 78b (Sample 142/92)	1	3,60	3,20	2,50
Qara-Quzaq, Silo 27 (Sample 11/92)	1	2,80	2,50	1,70
Qara-Quzaq, Silo 53 (Sample 1/92)	1	2,30	1,40	1,20
Qara-Quzaq, Hearth 93 (Sample 129/92)	1	2,20	2,00	1,40
Qara-Quzaq, Silo 35 (Sample 5/92)	2	1,90	1,50	1,25

Assyrian herbal a plant called <sup>sam</sup>A-ŠI-A-ŠI, <sup>sam</sup>NIM or *baltu* has been identified as a capers plant. The Chicago Assyrian Dictionary renders it as "thornbush", perhaps "camelthorn" pointing thus alternatively to the leguminosae *Alhagi* sp. <sup>sam</sup>*Baltu* may be connected with the word *baltu* "male or female sexual parts" and we may see in this a comparison with the curious red fleshy pulp of the capers fruit (Fig. 15), but also possibly to the particular shape and colour of *Alhagi* flowers (Fig. 16). <sup>is</sup>NIM *pikinnitu* is the equivalent for "white *baltu*", the reference being to the white flowers of *Capparis* subgenus *Capparis* (or alternatively the whitish varieties of *Alhagi* flowers). In cuneiform texts of the Ur III period administrative documents define "a weed which large crews of workmen remove from field" pointing again both to *Alhagi* and alternatively *Capparis*, or another plant infesting the field crops of Mesopotamia. The omens show that "if <sup>is</sup>NIM-PAR - white capers - appear in a field in the middle of a town, the field will be destroyed, and the (owner) die" (Campbell-Thompson 1949). The *Aspalathus* cited in the Ecclesiasticus 24:15 is most probably the capers (*Capparis* sp.). It has an Akkadian linguistic cognate, *supalu*. (Miller 1995; 2001).

The chief uses, described in cuneiform medical texts, of the <sup>is</sup>*baltu* or <sup>is</sup>*baltu pisetu* (white caper), apart from the pickling of the *nibi'* (shoots or buds), are paralleled for the most part in later pharmacopoeias such as those of Dioscorides or Pliny in the 1st cent. A.D. (Gunther 1968; Desfontaines 1829a,b). It is used in prescriptions for strangury (painful drop by drop discharge of urine) and menstruation, and in poultices for inflammatory conditions. In these circumstances the sprouts, roots, leaves, flowers, pollen and seeds are employed.

Campbell Thompson (1924; cited by Blakelock and Townsend 1980) recorded that the dried leaves steeped in vinegar have been used in Syria for application to head ulcer scabs.

#### *Species of Capparis in the Eastern Mediterranean, Turkey and the Levant: geographical distribution, archaeological finds and written sources*

The data are summarised in Table 6 and Fig. 19.

Capers are still widespread in these regions today, especially near the Mediterranean. The dominant species in the north is *Capparis sicula*, its range extending along the islands of the Aegean, Cyprus, West Anatolia and south Greece. *Capparis aegyptia* is common in the Sinai, Egypt and Israel where *C. sicula* becomes scarce. *Capparis orientalis* is frequent on cliffs of south Greece and the Aegean coasts of Turkey. The Bedouins of Egypt know and use *C. decidua* and *C. cartilaginea* which occur relatively frequently there and in the Arabian Peninsula. A few specimens identified as *C. x spinosa* were collected in west Anatolia.

The Upper Palaeolithic of Franchti Cave in Greece (van Zeist 1991) and the Natufian of Hayonim Terrace in Israel (Kroll 2001; Buxó 1999) contain noteworthy seed finds. These early remains could point to the gathering of

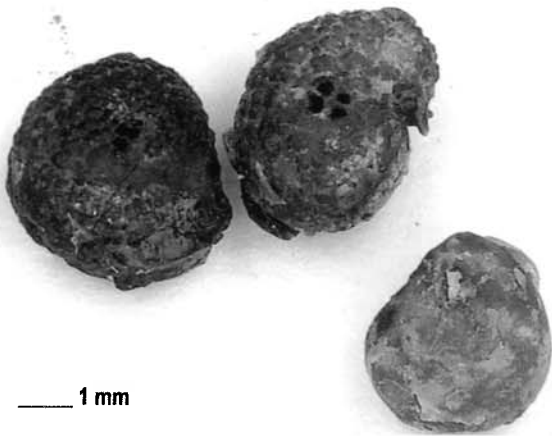


Fig. 7. *Capparis decidua* from Yemen. Large sized group



Fig. 8. *Capparis sicula* ssp. *sicula* seeds from the Argaric site of Almendricos (Spain). Medium sized group



Fig. 9. *Capparis sicula* ssp. *mesopotamica* seeds from Iraq. Medium sized group



Fig. 10. *Capparis sicula* ssp. *herbacea* seeds from Georgia. Medium sized group



Fig. 11. *Capparis orientalis* seeds from Mallorca (Spain). Medium sized group

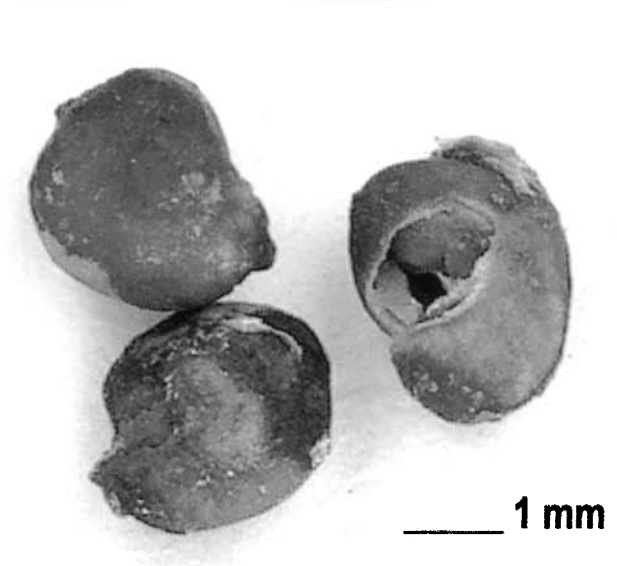


Fig. 12. *Capparis ovata* seeds from Algeria. Small sized group

**Table 6.** Finds of *Capparis* in archaeological contexts from the Eastern Mediterranean, Egypt, Anatolia and the Levant. Seeds are the type of plant remains reported unless otherwise stated in the column reference

Period	Site	Country	Reference	Proposed Identification
<b>Upper Palaeolithic</b>				
9000-7400 B.C.	Franchti Cave	Greece (Argolid)	van Zeist 1991	<i>C. sicula</i> ssp. <i>sicula</i>
Natufian	Hayonim Terrace	Israel	Kroll 2001; Buxó 1999	<i>C. aegyptia</i>
<b>Neolithic</b>				
PPNB, 7100-6200 B.C.	Nahal Hemar	Israel	Kislev 1988	<i>C. aegyptia</i>
PPNB	Jericho	Israel	Western 1971 (charcoal)	<i>C. aegyptia</i>
PPNB	Wadi Jibah	Egypt (Sinai)	Barakat cited by Close 2002	<i>C. decidua</i>
Aceramic Neolithic	Khirokitia	Cyprus	Kroll 2001	<i>C. sicula</i> ssp. <i>sicula</i>
Early Neolithic	Nabta Playa	Egypt	Kroll 2001; Wasylkova & Dahlberg 1999	<i>C. decidua</i>
PPN	Beffia	Jordan (southern)	Helbaek 1970	<i>C. sicula</i> ssp. <i>leucophylla</i>
7400-6250 B.C.	Franchti Cave	Greece (Argolid)	van Zeist 1991	<i>C. sicula</i> ssp. <i>sicula</i>
Neolithic	Çatalhöyük	Turkey	Asouti et al. 2001	<i>C. sicula</i> ssp. <i>mesopotamica</i>
Neolithic, ca. 5400-5200 B.C.	Hacilar	Turkey	Helbaek 1970	<i>C. sicula</i> ssp. <i>mesopotamica</i>
Neolithic, 3960-3020 B.C.	Kadero	Sudan	Kroll 1996; Barakat 1995 (charcoal)	<i>C. decidua</i>
<b>Chalcolithic</b>				
Chalcolithic	Kissonerga - Milouthkia	Cyprus	Murray 2001	<i>C. sicula</i> ssp. <i>sicula</i>
<b>Bronze Age:</b>				
Late Bronze Age, ca. 1600-1000 B.C.	Hala Sultan Teke	Cyprus	Kroll 1991	<i>C. sicula</i> ssp. <i>sicula</i>
Early/Middle Bronze Age, ca. 2500-2000 B.C.	Marki - Alonia	Cyprus	Kroll 1997; Frankel & Webb 2001; Adams & Simmons 1993	<i>C. sicula</i> ssp. <i>sicula</i>
<b>Iron Age</b>				
Amarna	Amarna	Egypt	Germer 1985 (Image in Petrat Collection)	<i>C. cartilaginea</i> / <i>C. zoharyi</i>
<b>Archaic</b>				
7th cent. B.C.	Samos	Greece	Kroll 1996; Kučan 1995	<i>C. sicula</i> ssp. <i>sicula</i> / <i>C. orientalis</i>
<b>Roman</b>				
Roman	Mons Claudianus	Egypt	Kroll 2000; van der Veen & Hamilton-Dyer 1998	<i>C. aegyptia</i>
Roman	Berenike	Egypt (Red Sea coast)	Kroll 2000; Cappers 1999a,b	<i>C. cartilaginea</i>
Roman?	Turin Shroud	Israel?	Danin 1997 (pollen)	<i>C. aegyptia</i>
<b>Medieval</b>				
Crusader Period	Gritille Höyük	Turkey (SE)	Miller 1992	<i>C. sicula</i> ssp. <i>herbacea</i>
A.D. 400-700	Abu Sha'ar	Egypt (Red Sea coast)	Kroll 2000; El Hadidi, Amer & Waly 1997	<i>C. decidua</i>
5th-6th cent. A.D.	Shenshef	Egypt (eastern desert)	Kroll 2000; Cappers 1999c	<i>C. cartilaginea</i>

ripe fruits for medicinal purposes or as food by man, but also by animals. The use as food of ripe fruits has only been documented for a few species (Appendix 1). The identification in Table 6 is made based on the present distribution of the species (Appendix 1).

Seeds were recovered from Neolithic layers (ca. 5400-5200 B.C.) of Hacilar, located in south-western Anatolia (Turkey) in the Isparta region, 25 km southwest of Burdur (37°31'N, 30°12'E) (Helbaek 1970). The seeds are medium sized and may belong to *Capparis sicula* s.l. (Table 6).

In general archaeobotanical capers are well documented in this area, occurring from the Palaeolithic to the Medieval period. This is consistent with the numerous texts clearly referring to *Capparis* as a known plant widely used (see below). The use of *Capparis* is extremely important in Greek and Turkish gastronomy, especially in and around the Aegean. The flower buds are still collected and

preserved in salt as appetisers. Occasionally immature fruits are consumed. Turkey has one of the major capers processing industries in the world.

Capers are mentioned in the bible in Ecclesiastes 12: 5, presumably as an aphrodisiac, probably ineffective: "and caper-berry shall fail". The King James version translates

**Table 7.** *Capparis* seed dimensions from Neolithic Hacilar (Helbaek 1970)

Hacilar	L (mm)	B (mm)
Maximum	2,92	2,50
Average		
Minimum	2,67	2,17
n = 3		



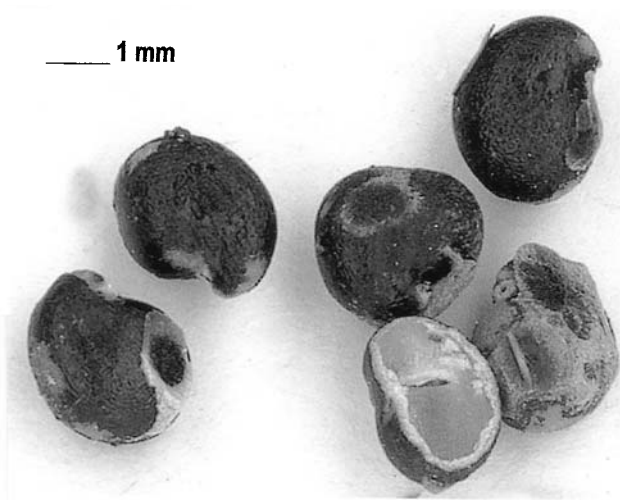


Fig. 13. *Capparis mucronifolia* seeds from Iran. Small sized group



Fig. 14. *Capparis parviflora* seeds from Afghanistan. Small sized group



Fig. 15. Ripe caper fruit (*Capparis sicula*), from Granada (Spain), opened, showing the red fleshy pulp and long stalk



Fig. 16. Camelthorn branches in blossom (*Alhagi* sp.), from Syria



Fig. 17. Caper flowers (*Capparis spinosa*) from Mallorca (Spain), showing the ovary over a long stalk, the gynophore

the Hebrew ab'ionah or abiyyonah as "desire" not "caper" however. This chapter is a well-known allegory of old age with reference to sight, hearing, white hair, and eventually, death. Included in the list of features of old age is when "the caperberry is ineffective", probably a reference to the use of the capers fruit, technically a berry, as an aphrodisiac. It is intended to indicate that even the stimulating effects of the capers cannot excite the appetite of the old man any longer (Moldenke and Moldenke 1952; Lytton 2001).

Capers is regarded as the "hyssop" of the Scriptures referred to in Exodus 12:22; Leviticus 14:6; Numbers 19:18; 1 Kings 4:33; Psalms 51:7; John 19:29; and Hebrews 9:19 (Moldenke and Moldenke 1952). Sir Thomas Brown in 1683 (Anonymous 2001) commented on 1 Kings 4: 33: "And [Solomon] spoke of trees, from the cedar tree that is in Lebanon even unto the hyssop that springeth out of the wall: he spoke also of beasts, and of fowl, and of creeping things, and of fishes". Anonymous (2001) suggested that this passage referred to capers, *Capparis*

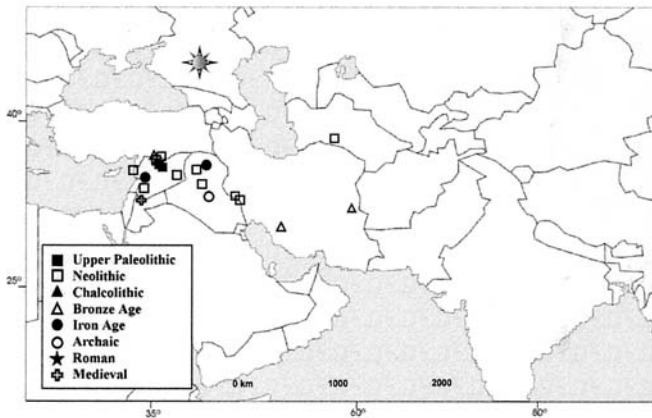


Fig. 18. Distribution map of archaeological findings of *Capparis* from the Near East and Central Asia

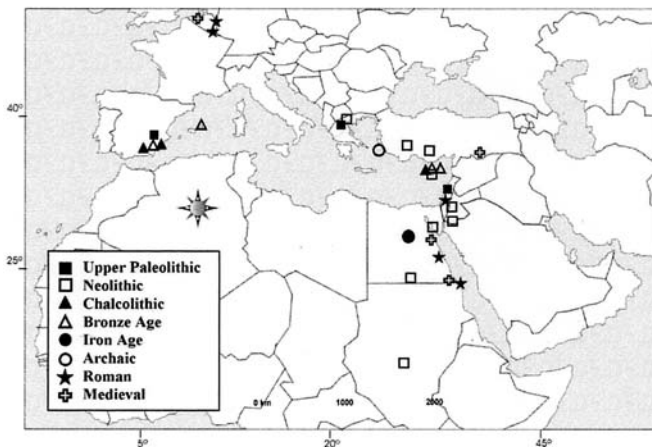


Fig. 19. Distribution map of archaeological findings of *Capparis* from the Mediterranean and Europe

*aegyptia*, which is (1) woody, (2) wall-growing, and (3) often decumbent, thus furnishing an excellent antithesis to the cedar while still remaining in the category "tree" (the translation of the Hebrew *ets* as "tree" is uncontested).

Aspalathus, a plant mentioned in Ecclesiasticus 24:15 is most probably the capers (*Capparis* sp.) (Miller 1995; 2001): "it gave a sweet smell like cinnamon and aspalathus, and it yielded a pleasant odour like the best myrrh, as galbanum, and onyx, and sweet storax, and as the fume of



Fig. 20. Fields of *Capparis spinosa* "Fuertes" in Llubí (Mallorca). Capers are grown there mixed with fig or olive trees

frankincense in the tabernacle". Ethnobotanical, archaeological and linguistic evidence shows that this plant has played a role in the ancient, but ongoing cultural tradition in the Near East.

A Rabbinic Responsum explained that *selaf*, *nispa* and the Aramaic *parha* have the same meaning; a well-known caper-shrub in Babylon and Palestine. It comes on the market twice annually: In the month of Nisan (the first month of the religious year, that of the Passover in spring), leaves and shoots, *timrot*, are bought. The still tender, edible shoots are prepared with milk. The fruit appears on the market later, in summer (Löw 1967).

The capers shrub daily bears fresh blooms that decline the next day and subsequently bear fruits. Rabin Gamaliel describes this shrub as a picture of "the promise", therefore the trees of the Holy Land will carry fruit to the End of Time, daily. The fruit sits on a long stalk (Fig. 17). Thus, the Talmud says: All fruit covering grow with the fruit, the fruit sits at the capers above (ovary and gynophore), the covering however (sits) below (sepals, receptacle) (Fig. 16). According to the opinion of the "House" of Shammai (Rabbinic tradition school, dated 1st cent. B.C.), the capers have an intermediate position between tree and herb. The caper is seen definitely as a tree by Maimonides (1979) (12th cent. A.D.). The first correct view on the matter was by Azulai. He says: If the *kafrisin* bud is still

Table 8. Finds of *Capparis* in archaeological contexts from Iran and Central Asia. Seeds are the type of plant remains reported unless otherwise stated in the column reference

Period	Site	Country	Reference	Proposed Identification
<b>Neolithic</b>				
Early Neolithic	Jeitun	Turkmenistan	Kroll 1996; Harris et al. 1993	<i>C. parviflora</i>
PPN	Tepe Ali Kosh	Iran	Helbaek 1970	<i>C. sicula</i> ssp. <i>leucophylla</i>
6th mill. B.C.	Tepe Sabz	Iran	Helbaek 1970; Lisicyna 1983	<i>C. sicula</i> ssp. <i>leucophylla</i>
Neolithic	Deh Luran	Iran	Wosley & Hole 1978	<i>C. sicula</i> ssp. <i>leucophylla</i>
<b>Bronze Age:</b>				
Kaftari 2200-1600 B.C.	Malyan	Iran (southwest)	Miller 1985 (charcoal)	<i>C. parviflora</i> ssp. <i>parviflora</i> (branches more lignified than in <i>C. sicula</i> ssp. <i>leucophylla</i> )
Bronze	Shahr-i-Sokhta	Iran (eastern)	Constantini 1977	<i>C. parviflora</i> ssp. <i>parviflora</i>

**Table 9.** Finds of *Capparis* in archaeological sites from Europe and the Western Mediterranean. Seeds are the type of plant remains reported unless otherwise stated in the column reference

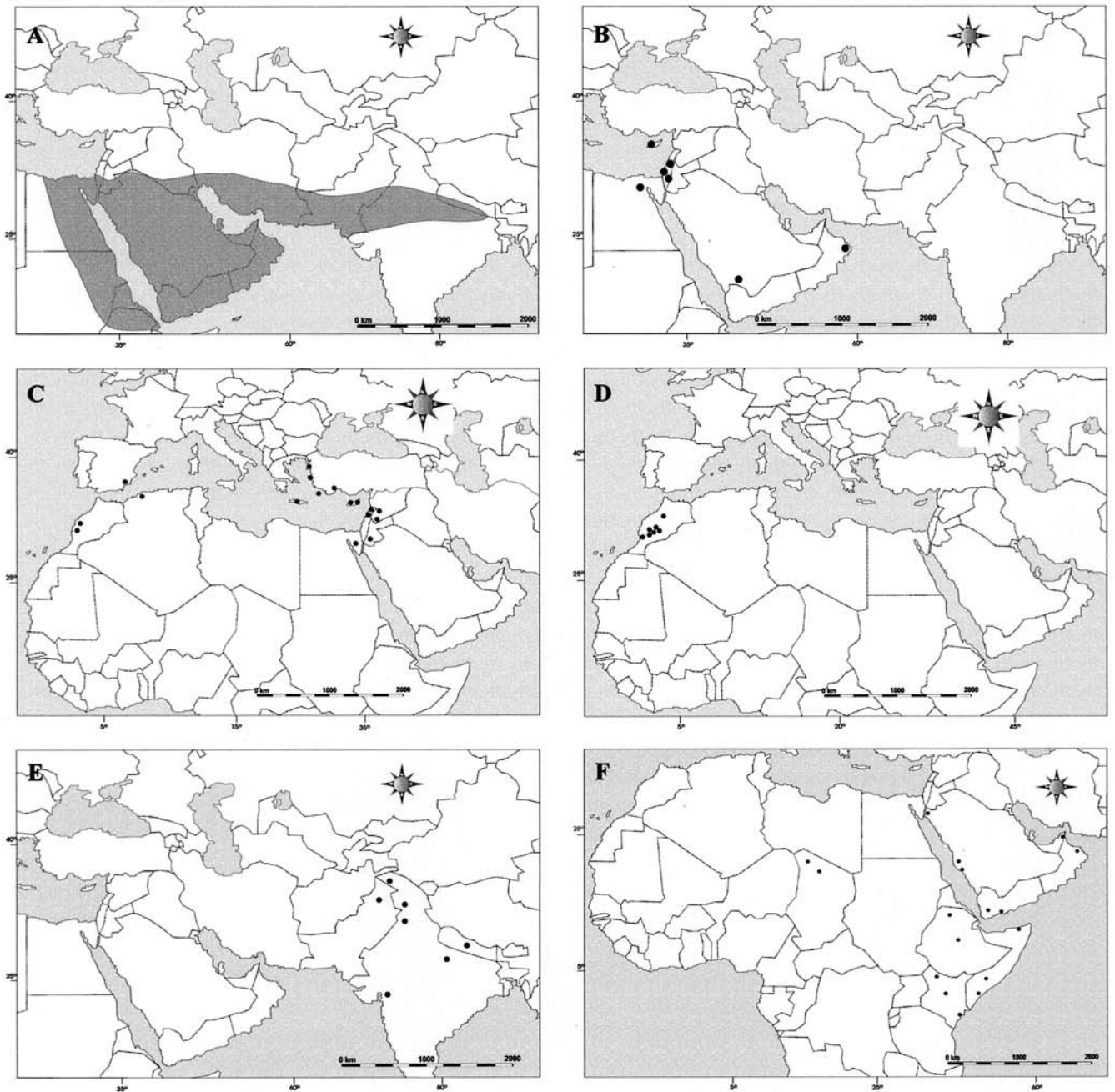
Period	Site	Country	Reference	Proposed Identification
<b>Upper Palaeolithic</b>				
Palaeolithic	Cueva Perneras	Spain (Murcia)	Rivera, Obón & Asencio 1988	<i>C. sicula</i> ssp. <i>sicula</i>
<b>Chalcolithic</b>				
Chalcolithic, ca. 1960 B.C.	Cueva Sagrada	Spain (Murcia)	Rivera, Obón & Asencio 1988	<i>C. sicula</i> ssp. <i>sicula</i>
Eneolithic	El Garcel	Spain (Almería)	Rivera, Obón & Asencio 1988	<i>C. sicula</i> ssp. <i>sicula</i>
<b>Bronze Age</b>				
Argaric	El Rincón de Almendricos	Spain (Murcia)	Rivera, Obón & Asencio 1988	<i>C. sicula</i> ssp. <i>sicula</i>
Late Bronze Age	Cova des Carritx	Spain (Menorca)	Kroll 2001; Stika 1999	<i>C. orientalis</i>
<b>Roman</b>				
1st-2nd cent. A.D.	Tongeren	Belgium	Kroll 1997; Vanderhoeven 1993; Cooremans 1999	<i>C. orientalis</i> / <i>C. spinosa</i>
1st-2nd cent. A.D.	Tienen	Belgium	Cooremans 1999	<i>C. orientalis</i> / <i>C. spinosa</i>
<b>Medieval</b>				
Middle Ages	Bruges	Belgium	Kroll 2001; Cooremans 1999	<i>C. orientalis</i> / <i>C. spinosa</i>

small, they are closed and one doesn't see the *abijjonot* in them. If they develop, they open, turning into large blooms. In the bloom, a mark appears (the receptacle with the nectary), at its top sits the *abijjonot* (Fig. 1). With the harvest come, the buds (*kafrisin*) and the fruits (*abijjonot*) are collected. The small buds are separated from the larger ones - the small ones are more valuable - and named *kafar sultanis*. Nowadays these buds are regarded as fruit, meanwhile the actual fruit (*abijjonot*) is considered as coming in second place and less appreciated.

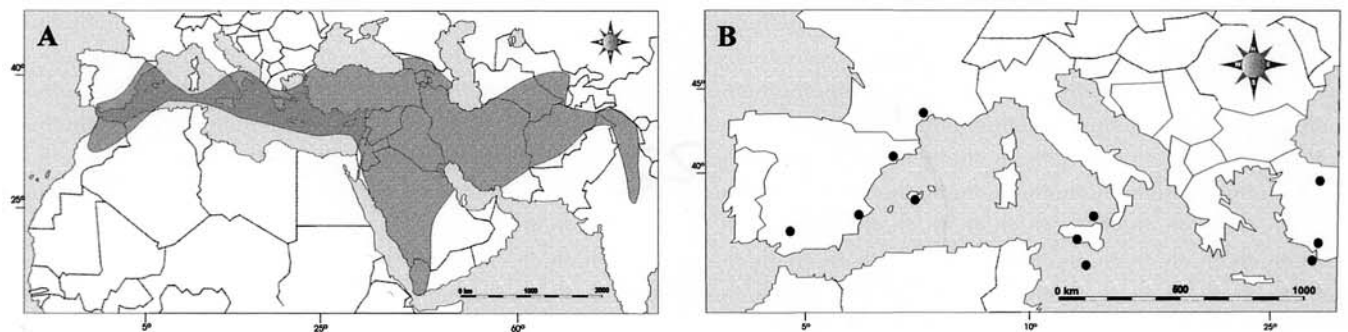
Midrash is the Hebrew term for "Interpretation" or "Exposition". The word is generally used for any written or oral commentary on a biblical text (2nd-9th cent. A.D.). Midrash exposes the values and worldview of the Rabbinic interpreter and audience rather than the original intention of the author of the biblical text (Smith 1999). The capers is rarely mentioned in the Midrash. It is once (within a metaphor) referred to: "the human being can master the evil instinct, as that of the Lupine with its bitterness, the mustard and the capers with their pungency" (in

**Table 10.** *Capparis* descriptions according to Theophrastus (4th cent. B.C.), Dioscorides, Pliny, Lucius Junius Moderatus Columella (1st cent. A.D.), Rutillius Taurus Aemilianus Palladius (4th cent. A.D.). (Gunther 1968; Hort 1980; Desfontaines 1829a,b; Castro 1959; Matthioli 1557; Moure 1990; Rackham 1992). Here we refer to caper / *καππαρης*

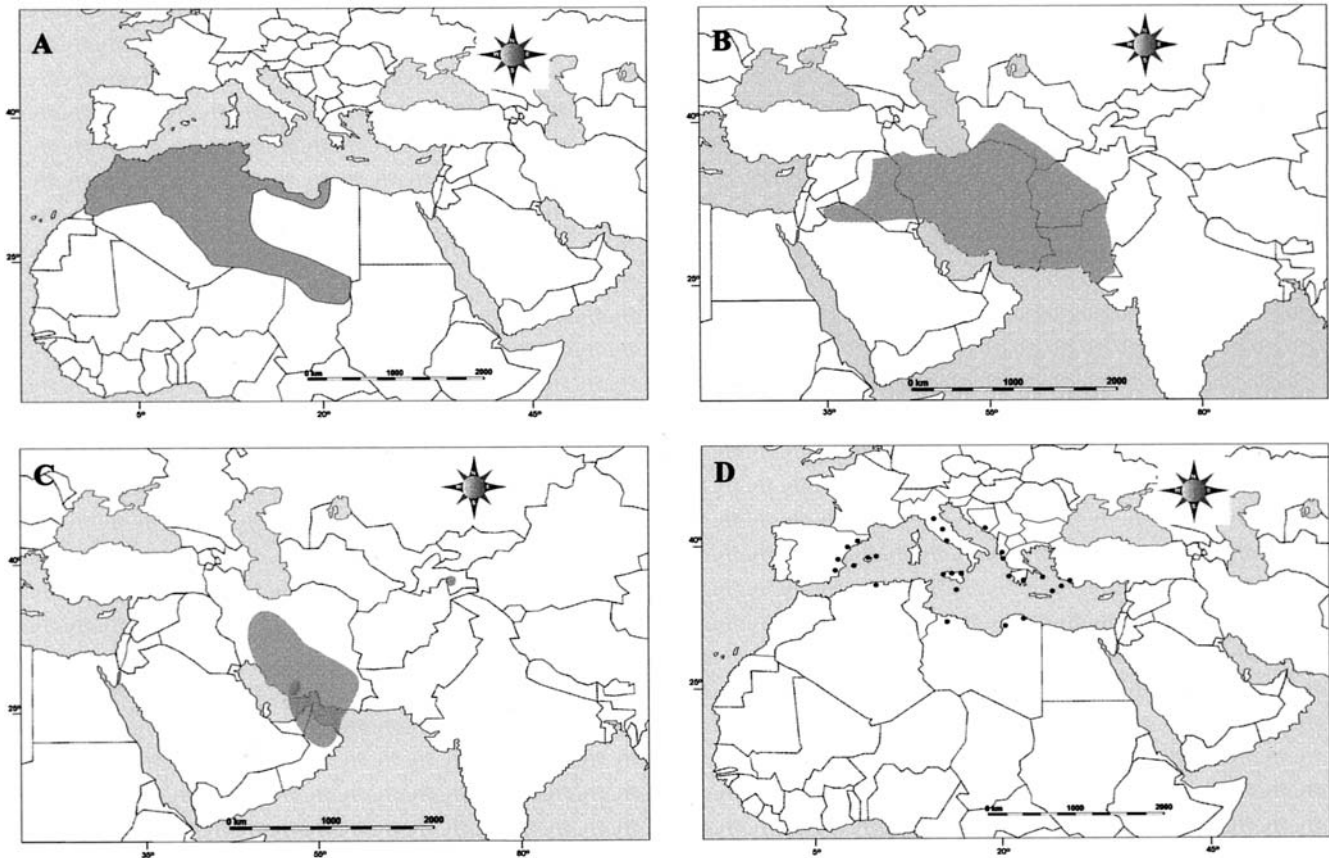
Descriptive text	Authors	Proposed Identification
Prickly shrub, spread in a round compass on the ground, prickles like a hook, the leaves round, a fruit like the olive.	Dioscorides	<i>C. aegyptia</i>
In Egypt (caper) is a common food. Pliny (Natural History XIII, 44. 127) describes the seed as a well-known food item. They are said to have a peppery flavour.	Pliny	<i>C. aegyptia</i>
Those from Alexandria are delightful for the taste and the sight	Matthioli on Dioscorides	<i>C. aegyptia</i>
African caper, especially that which grows with the people called Marmaridae (Libya) does cause inflations	Dioscorides, Pliny	<i>C. ovata</i>
The African is harmful to gingival	Pliny	<i>C. cartilaginea</i> / <i>C. decidua</i> ?
That from the Red Sea and Arabia, is extremely sharp, raising pustules in the mouth and eating up the gums to the bare bone, wherefore it is detrimental to be eaten	Dioscorides	<i>C. cartilaginea</i> / <i>C. decidua</i> ?
The Arabian (caper) is pestilent	Pliny	<i>C. cartilaginea</i> / <i>C. decidua</i> ?
(caper plants) grow abundantly in the ruins of Rome	Matthioli on Dioscorides	<i>C. orientalis</i>
Do not consume capers from beyond the Sea, the Italian ones are less noxious	Pliny	<i>C. orientalis</i>
In March and April you can plant capers. In September and October sow capers in dry soil surrounded with a deep furrow or a wall.	Pliny, Palladius	<i>C. orientalis</i>
That of Apulia (Italy) provokes vomiting	Dioscorides, Pliny	<i>C. sicula</i>
Grow plenty in Cyprus	Matthioli on Dioscorides	<i>C. sicula</i>
The most appreciated come from Carya (SW Anatolia) and Phrygia (Central Anatolia)	Matthioli on Dioscorides	<i>C. sicula</i> ssp. <i>herbacea</i>
The plant refuses cultivation, the fruits are better in wild state, has spines on the twigs, grows and flowers entirely in summer	Theophrastus	<i>C. sicula</i>
It grows spontaneously in fallow fields. Do plant the capers in April	Columella	<i>C. sicula</i>



**Fig. 21.** Maps of *Capparis* species distribution: A-*C. decidua*; B-*C. aegyptia*; C-*C. zoharyi*; D-*C. atlantica*; E-*C. napaulensis*; F-*C. cartilaginea*



**Fig. 22.** Maps of *Capparis* species distribution: A-*C. sicula* (incl. ssp. *herbacea*, *mesopotamica*, *sindiana* and *sicula*); B-*C. x spinosa*



**Fig. 23.** Maps of *Capparis* species distribution: A-*C. ovata*; B-*C. parviflora* (incl. ssp. *kurdica*, *parviflora* and *sphaerocarpa*); C-*C. mucronifolia* (incl. ssp. *rossanoviana* and *mucronifolia*); D-*C. orientalis*

the same way as man can manage the bitterness of Lupin by soaking it in water and the strong taste of capers by brining it, he can master his negative instinct) (Löw 1967). Talmudic medicine found an application for the decoction of the root-bark. Roubinov reports that folk-medicine still used the root-bark in Palestine in the 19th century. In some villages of the Efraim range, people used the pounded root and *Clematis cirrhosa* as a blistering method, its application however leaving scars behind. The Arabs used the branches in order to remove leeches swallowed with water. The branch was introduced through the mouth into the digestive tract and, on withdrawal from the pharynx and oesophagus, its hooked thorns extracted the leech (Löw 1967).

Aspalathus is mentioned in Pliny the Elder's Natural History, Dioscorides' De Materia Medica, and Theophrastus' Enquiry into Plants (Miller 1995, 2001). The latter wrote in the 4th cent. B.C. (Hort 1980): "Now this is a general list of the plants used for perfumes: cassia, cinnamon, cardamom, spikenard, nairon, balsam of Mecca, aspalathos, storax, iris, narte, kostos, all-heal, saffron-crocus, myrrh, kypeiron, ginger-grass, sweet-flag, sweet marjoram, lotos, dill. Of these it is the roots, bark, branches, wood, seeds, gum or flowers which in different cases yield the perfume. Some of them grow in many places, but the most excellent and most fragrant all come from Asia and sunny regions. From Europe itself comes none of them except the iris".

Pliny wrote (Desfontaines 1829a,b, Latin edition; Rackham 1992, English translation): "In the same region [Cyprus] grows camel's thorn [aspalathos], a white thorn

of the size of a moderate-sized tree, with the flower of a rose; the root is in request for unguents. People say that any shrub over which a rainbow forms its arch gives out a scent as sweet as that of the aspalathus, but that if this happens in the case of an aspalathus a scent rises that is indescribably sweet. Some call this shrub red scepter [erysisceptrum] and others scepter. The test of its genuineness lies in its fiery red colour, firmness to the touch and scent like that of beaver-oil. It is sold for 5 denarii a pound".

Dioscorides in De Materia Medica (Gunther 1968) wrote: "Aspalathus, some call Erysisceptron [i.e., red scepter]. It is a woody kind of shrub having many prickly thorns, growing in Istrus, and Nisyrus, and Syria, and Rhodes, which the ointment makers use for the thickening of their ointments. That is good which is heavy, and after it is barked about, tending to a red or a purple colour, thick, odoriferous, and bitter in the taste". Syrian folk-medicine uses crushed caper-leaves in vinegar for ulcers and scabs which appear on the head. One should handle it however carefully, because it can cause harm; the root-bark is also used (Löw 1967).

In Egypt capers seeds were added to wine to keep it sweet, and were also used as a condiment (Renfrew 1987a).

#### *Finds of Capparis in archaeological contexts from Central Asia and Iran*

The data are summarised in Table 8 and Fig. 18.

The findings are relatively recent compared with those from the Mediterranean and the Levant and, as above,

identification is approached tentatively on the basis of the present distribution of taxa. The settlements of the Jeitun culture stretched in a chain almost 700 km along the northern foothills of the Kopet Dag (Turkmenistan) but are related to sites to the west around the Caspian (Dani and Masson 1999). Therefore the capers in Jeitun may have some relationship with the finds from Iranian sites.

References to capers for later periods have not been recorded here but this should not be interpreted as a loss of interest in the uses of *Capparis* because it is still used today in the area (Appendix 1). This lack of data is interpreted in terms of the scant attention paid to the exhaustive recovery of plant materials in excavations of more recent sites. It is therefore expected that archaeobotanical studies of more recent sites will cast new light on the continuous or discontinuous presence of this genus in the archaeological record of Central Asia and Iran.

#### *Finds of Capparis in archaeological contexts from Europe, North Africa and the Western Mediterranean*

The data are summarised in Table 9 and Fig. 19.

Capers seeds have been reported from archaeological sites of the Iberian Peninsula and Balearic Islands, all within the present distribution of *Capparis sicula* and/or *C. orientalis*. The earliest remains in the Palaeolithic Pernerias Cave near Murcia could be attributed to accidental deposits or even the activities of animals inhabiting this site. The capers consumed today in Mediterranean Spain are normally brined, and include not only the flower buds, but also the immature fruits and the tender twigs. Presence of seeds in Chalcolithic or Bronze Age contexts can be related to the use of ripe and immature fruits, but also to the gathering of seeds, not by man but by animals living in the houses (mice, ants, etc.).

There are no finds of *Capparis* from archaeological sites in Italy or France. Nevertheless both countries are today major consumers of capers flower buds and this tradition seems to be deeply rooted.

The presence of capers seeds in Medieval ditches and pits dating between A.D. 1200 and A.D. 1495 in Bruges (Belgium) implies that either the plant was grown locally or whole fruits were imported from the Mediterranean region. Given the circumstances, time period and the role of medieval Bruges as an important trade centre, the latter seems to be most likely (Cooremans 1999).

## Conclusion

### *Origins of capers cultivation and domestication*

It is evident that capers are cultivated and were domesticated (possibly in different places) because local capers cultivars occur in Sicily, Salina Island, Pantelleria, Balearic Islands, etc. (Rivera et al. 1999), but determining where and when domestication occurred is more complicated. The hybridisation of *C. sicula* and *C. orientalis* occurs easily and there are many intermediate types in culture which have given rise to a large selection of cultivated varieties, most of them within *C. spinosa* (Barbera and Di Lorenzo 1984; Rivera et al. 1999). These are often grown mixed with olive or fig trees (Fig. 20). Due to their neigh-

bouring habitats and entomophilous pollination, gene flow between cultivated plants and wild populations is high (Barbera et al. 1991). The greatest diversity of capers actually in cultivation is concentrated in the Western Mediterranean, in the islands and around the Tirreanean Sea, and comprises *C. sicula*, *C. orientalis* and *C. spinosa* cultivars.

Propagation can be achieved both by seed and by rooted cuttings. The heterogeneous population obtained from seed is considered sufficiently homogeneous to ensure the quality and quantity of the crop. This method is commonly used in Pantelleria Island (Italy) for *C. orientalis* "nucciddara". The use of rooted cuttings is common in the Aeolian archipelago (Italy) and in Mallorca (Spain) for *C. x spinosa* cultivars. At the close of the 16th century De Serres (1996, facsimile of the 16th century book) recognised cuttings as having been the best method for propagation of capers.

Capers cultivation is clearly attested by Pliny, Columella and Palladius (Table 10) back to the 1st and 4th cent. A.D., although Theophrastus (4th cent. B.C.) describes capers as unsuitable for cultivation. This raises the question as to whether cultivation started in the period between 4th cent. B.C. and 1st cent. A.D., somewhere in the Western Mediterranean. Archaeobotanical evidence and present cultivation areas in the Western Mediterranean coincide only in the Balearic islands. Note that there is no archaeological evidence from either France or Italy although capers were widely grown in Provence (France), especially in the region of Toulon, less since the Renaissance. Their propagation with rooted cuttings or seeds in autumn, and winter protection with mulching were usual (Cazin 1868).

In Palestine it is no longer a crop-plant today, although it was cultivated in old Palestine. Roubinov, who extensively reports its occurrence, confirms that it was no longer grown at the end of the 19th century (Löw 1967).

In Turkey capers are grown in the Aegean coast areas under a Mediterranean climate. It seems that local cultivars of *C. spinosa* have existed there at least since the 19th century, according to some herbarium specimens from SW Anatolia examined in this study. However, it is evident that today Turkish capers are mainly from *Capparis sicula* ssp. *sicula* and *herbacea* (Inocencio et al. 2002).

The jar from Tell es-Sweyhat, Syria, may point towards the established use of pickled capers in the Bronze Age but does not imply that capers were cultivated there, as even today most of the commercial capers come from wild plants (Inocencio et al. 2002).

Normally the main reason for present-day cultivation of *Capparis* is the consumption of the pickled flower buds. However there are alternative interpretations of its ancient use and cultivation that involve the use of the ripe fruits as food. Akgül and Özcan (1999) found that the seeds of capers (*C. sicula* and *C. spinosa*) are rich in protein, oil and fibre with a high proportion of unsaturated fatty acids, suggesting that they might be valuable as food, and therefore may have been used as such in the past. The *lasafs* of the Bedouins, up to the 19th century, grew in the Wadi Hebian. On the edges grew plants with big juicy husks, and good tasty fruit as long as a finger. The ripe fruit there were beneficial as food. Their bitter peel exuded a white sugary juice that melted in the sun (Löw 1967). People who were ill used the hot steam of Hammam Faraun in the

Sinai Peninsula. They were supposed to lower themselves on ropes into the openings and linger 40 days in them. Their staple food was the *lasaf* fruit. At the Carmel, the fruits were used as food and/or as condiment (Löw 1967). Therefore although in present times the use as food of capers is restricted to pickled flower buds, unripe fruits and shoots, it seems likely that consumption of the ripe fruit played a relevant role in ancient usage and in the beginning of the cultivation and domestication of capers.

The fragmented pattern of the present-day distribution of many *Capparis* species (Appendix 1, Figs. 21-23) leads us to accept the idea of the long-distance transport of capers fruits and seeds. Thus, capers species could become accidentally naturalised in localities far beyond their original distribution, as crops or as weeds only.

In summary we propose a hypothetical model for *Capparis* domestication that involves local cultivation in different parts of the Mediterranean. Beyond these accidental long distance transport of some seeds and fruits occurred, as did hybridisation with wild populations, in different places and at different periods.

## References

- Adams R, Simmons D (1993) Appendix. Botanical remains from Bronze Age Marki-Alonia, Cyprus. Reports Department Antiquities Cyprus 1993: 66-68
- Akgül A, Özcan M (1999) Some compositional characteristics of capers (*Capparis* spp.) seed and oil. *Grasas Aceites* 50: 49-52
- Anonymous (2001) Sir Thomas Browne -1683- Certain Miscellany Tracts. Tract 1: Observations upon Scripture Plants. <http://penelope.uchicago.edu/misctracts/notes.html>
- Asouti E, Erkal A, Fairbairn A, Hastorf C, Kennedy A, Near J, Miller-Rosen A (2001) Archaeobotany and related plant studies. <http://catal.arch.cam.ac.uk/catal/Archive-rep99/fairbairnkennedy99.html>
- Barakat HN (1995) Middle Holocene vegetation and human impact in central Sudan: charcoal from the Neolithic site at Kadero. *Vegetation History and Archaeobotany* 4: 101-108
- Barbera G, Di Lorenzo R (1984) The caper culture in Italy. *Acta Horticulturae* 144: 167-171
- Barbera G, Di Lorenzo R, Barone E (1991) Observations on *Capparis* populations cultivated in Sicily and on their vegetative and productive behaviour. *Agricoltura Mediterranea* 121: 32-39
- Blakelock R, Townsend C (1980) Capparidaceae. In: Townsend C, Guest E (eds) *Flora of Iraq*, vol 4, part 1. Ministry of Agriculture & Agrarian Reform, Baghdad, pp 139-145
- Bobrov E (1970) Capparidaceae. In: Komarov V (ed) *Flora SSSR*, vol 8. IPST, Jerusalem, pp 2-14
- Buxó, R (1999) Chapter 14. Reflections on paleobotanical remains from Hayonim Terrace (upper Galilee). In: Anderson PC (ed) *Prehistory of Agriculture*. Institute of Archaeology, University of California, Los Angeles, pp 153-155; 282-306
- Campbell-Thompson R (1924) *The Assyrian Herbal*. Luzac, London
- Campbell-Thompson R (1949) *A dictionary of Assyrian botany*. The British Academy, London
- Cappers RTJ (1999a) Chapter 16. The archaeobotanical remains. In: Sidebotham ST, Wendrich NZ (eds) *Berenike 1997, Report of the 1997 excavations at Berenike and the Survey of the Egyptian Eastern Desert, including excavations at Shenshef*. Leiden, pp 299-305
- Cappers RTJ (1999b) Chapter 15. Trade and Subsistence at the Roman port of Berenike, Red Sea coast, Egypt. In: Veen M van der (ed) *The exploitation of plant resources in ancient Africa*. Plenum, New York, pp 185-197
- Cappers RTJ (1999c) Chapter 22. Archaeobotanical remains from Shenshef. In: Sidebotham ST, Wendrich NZ (eds) *Berenike 1997, Report of the 1997 excavations at Berenike and the Survey of the Egyptian Eastern Desert, including excavations at Shenshef*. Leiden, pp 419-426
- Castro C (1959) *Columela los Doce Libros de Agricultura*, vol 2. Iberia, Barcelona
- Cazin FJ (1868) *Traité pratique et raisonné des plantes médicinales indigènes*. P. Asselin, Paris
- Close A (2002) Research Projects, The funerary monuments of El'Awag. <http://faculty.washington.edu/aeclose/research.htm>
- Cooremans B (1999) An unexpected discovery in Medieval Bruges (Flanders, Belgium): Seeds of the caper (*Capparis spinosa* L.). <http://www.shef.ac.uk/uni/academic/A-C/ap/envarch/vol4.html>
- Costantini L (1977) Le piante. In: Tucci G (ed) *La Citta Bruciata del Deserto Salato*. Erizzo Editrice, Venice, pp 159-171
- Dani AH, Masson VM (1999) *History of civilizations of Central Asia*, vol 1. Motilal Banarsidass Publishers, Delhi.
- Danin A (1997) Pressed Flowers. *Eretz Magazine* 6: 35-37, 69
- De Serres O (1996) *Théâtre d'Agriculture et Mesnage des Champs*. Actes Sud, Arles
- Desfontaines L (1829a) *Caii Plinii Secundi Historiae Naturalis Vol. V*. Lemaire, Paris
- Desfontaines L (1829b) *Caii Plinii Secundi Historiae Naturalis Vol. VI*. Lemaire, Paris
- El Hadidi MN, Amer WM, Waly NM (1997) Catalogue of archaeological specimens in Cairo University herbarium 2. Abu Shaa'ar site, Red Sea Coast - Egypt; season 1991. *Taekholmia* 17: 47-60
- Frankel D, Webb J (2001). The Marki Project. <http://www.archaeology.latrobe.edu.au/research/marki/flora.html>
- Germer R (1985) *Flora des pharaonischen Ägypten*. Verlag Philipp von Zabern, Mainz
- Gunther R (1968) *The Greek Herbal of Dioscorides*. Hafner Publishing Co, London.
- Harris DR, Masson VM, Berezkin YE, Charles MP, Gosden C, Hillman GC, Kasparov AK, Korobkova GF, Kurbansakhatov K, Legge AJ, Limbrey S (1993) Investigating early agriculture in central Asia: new research at Jeitun, Turkmenistan. *Antiquity* 67: 324-338
- Helbaek H (1964) Early Hassunan vegetable at Es-Sawarra near Samarra. *Sumer* 20: 45-48
- Helbaek H (1966) The plant remains from Nimrud. In: Mallowan, ME (ed) *Nimrud and its remains*, appendix L, vol 2. Collins, London, pp 613-620
- Helbaek H (1970) The plant husbandry of Hacilar. In: Mellaart J (ed) *Excavations at Hacilar*. vol 1. Edinburgh University Press, Edinburgh, pp 189-244
- Helbaek H (1972a) Traces of plants in the Early ceramic site of Umm Dabaghiyah. *Iraq* 34: 17-19
- Helbaek H (1972b) Samarran irrigation agriculture at Choga Mami in Iraq. *Iraq* 34: 35-48
- Hillman G (1975) The plant remains from Tell Abu Hureyra. A preliminary report. In: Moore AMT, Hillman GC, Legge AJ (eds) *The excavation of Tell Abu Hureyra*. *Proceedings Prehistory Society* 41: 70-73
- Holmgren P, Holmgren N, Barnett L (1990). *Index Herbariorum*. *Regnum Vegetabile* 120: 1-693
- Hort AF (1980) *Theophrastus, Enquiry into Plants*. Harvard University Press, Cambridge
- Inocencio C, Rivera D, Alcaraz F, Tomás-Barberán F (2000) Flavonoid content of commercial capers (*Capparis spinosa*, *C. sicula* and *C. orientalis*) produced in Mediterranean countries. *European Food Research and Technology* 212: 70-74
- Inocencio C (2001) *Caracterización de Capparis L. Subgénero Capparis (Capparaceae)*. Universidad de Murcia, Murcia (PhD. Thesis)

- Inocencio C, Alcaraz F, Calderón F, Obón C, Rivera D (2002) The use of floral characters in *Capparis* sect. *Capparis* to determine the botanical and geographical origin of capers. *European Food Research and Technology* 214: 335-339
- Jacobs M (1965) The Genus *Capparis* (Capparaceae) from the Indus to the Pacific. *Blumea* 12: 385-541
- Kislev M. (1988) Nahal Hemar Cave. Dried plant remains, an interim report. *Atiqot* 18: 76-81.
- Kroll H (1991) Südeuropa. In: Zeist W van, Wasylikowa K, Behre KE (eds) *Progress in Old World Palaeoethnobotany*. Balkema, Rotterdam, pp 161-177
- Kroll H (1996) Literature on archaeological remains of cultivated plants (1994/1995). *Vegetation History and Archaeobotany* 5: 169-200
- Kroll H (1997) Literature on archaeological remains of cultivated plants (1995/1996). *Vegetation History and Archaeobotany* 6: 25-67
- Kroll H (2000) Literature on archaeological remains of cultivated plants (1998/1999). *Vegetation History and Archaeobotany* 9: 31-68
- Kroll H (2001) Literature on archaeological remains of cultivated plants (1999/2000). *Vegetation History and Archaeobotany* 10: 33-60
- Kučan D (1995) Zur Ernährung und dem Gebrauch von Pflanzen im Heraion von Samos im 7. Jahrhundert v. Chr. *Jahrbuch Deutsches Archäologisches Institut* 110: 1-64
- Lisicyna G (1983) Die ältesten paläoethnobotanischen Funde in Nordmesopotamien. *Zeitschrift für Archäologie* 17: 31-38
- Löw I (1967) Die Flora der Juden, vol 1. Georg Olms, Hildesheim (Facsimile of the 1928 edition)
- Lytton J (2001) Plant lore and image in the Solomonian writings. <http://www.biblicalgardens.com/articles/article-musselman-solomon-plant-life.htm>
- Maimonides M (1979) *The book of agriculture*. Yale University Press, New Haven.
- Matilla G, Rivera D, Obón C (1994) Estudio Paleoetnobotánico de Tell Qara Quzaq, I. In: Olmo G del (ed) *Tell Qara Quzaq I*. Ed. AUSA, Sabadell, pp 151-182
- Matthioli A (1557) *I Discorsi ne I Sei Libri della Materia Medicinale*. Erasmus, Venezia
- McCorrison J (1995) Preliminary archaeobotanical analysis in the middle Habur Valley, Syria and studies of socioeconomic change in the early third millennium BC. *Bulletin Canadian Society for Mesopotamian Studies* 29: 33-46
- Miller N (1985) Palaeoethnobotanical evidence for deforestation in ancient Iran: a case study of urban Malyan. *Journal of Ethnobiology* 5: 1-19
- Miller N (1992) The Crusader Period Fortress: Some archaeobotanical samples from Medieval Gritille. *Anatolica* 18: 87
- Miller N (1995) The *Aspalathus* Caper. *Basor* 297: 55-60
- Miller N (2001) The *Aspalathus* Caper. <http://www.asor.org/BASOR/297abstracts.html>
- Moldenke H, Moldenke A (1952) Plants of the bible. *Chronica Botanica* 28: 1-328
- Moure A (1990) *Paladio Tratado de Agricultura, Medicina, Veterinaria*. Gredos, Madrid
- Murray MA (2001) Archaeobotanical report. In: Peltenburg E, Bolger D, Croft P, Goring E, Irving B, Lunt DA, Manning SW, Murray MA, McCartney C, Ridout-Sharpe JS, Thomas G, Watt ME, Elliott-Xenophonos C (eds) *Excavations at Kissonerga-Mosphilia, 1979-1992*. <http://www.arcl.ed.ac.uk/arch/publications/cyprus/kissonerga>
- Öztürk M, Özçelik M (1991) Dogu Anadolunun Faydali Bitkileri. Useful plants of East Anatolia. SISKAV, Ankara
- Rackham H (1992). *Pliny the Elder Natural History*. (Loeb Classical Library). Harvard University Press. Cambridge
- Renfrew J (1987a) Fruits from ancient Iraq: the paleoethnobotanical evidence. *Bulletin Sumerian Agriculture* 3: 157-161
- Renfrew J (1987b) A note on vegetables from ancient Iraq. *Bulletin Sumerian Agriculture* 3: 162
- Rivera D, Obón C, Asencio A (1988) *Arqueobotánica y Paleoetnobotánica en el Sureste de España*. Datos preliminares. *Trabajos de Prehistoria* 45: 317-334
- Rivera D, Alcaraz F, Inocencio C, Obón C, Carreño E (1999) Taxonomic study of cultivated *Capparis* Sect. *Capparis* in the Western Mediterranean. In: Andrews S, Leslie AC, Alexander C (eds) *Taxonomy of Cultivated Plants*. Royal Botanic Gardens, Kew, pp 451-455
- Smith M (1999) Rabbinic Tradition. <http://religion.rutgers.edu/iho/tradition.html>
- Stika HP (1999) Los macrorrestos botánicos de la Cova des Càrritx. In: Lull V, Micó R, Rihuete C, Risch R (eds) *La Cova des Càrritx y la Cova des Mussol*. Barcelona, pp 521-531
- Sundara G (1993) Capparaceae. In: Sharma BD, Balakrishnan NP (eds) *Flora of India*, vol 2. Botanical Survey of India, New Delhi, pp 248-335
- Vanderhoeven A (1993) 6 De plantaardige resten. In: Vanderhoeven A, Vynckier G, Vynckier P, *Het ovdheidkundig bodemondenzoek aan de Veemarkt te Tongeren*. *Archeol Vlanderen* 3: 127-205
- Veen M van der, Hamilton-Dyer S (1998) A life of luxury in the desert? The food and fodder supply to Mons Claudianus. *Journal of Roman Archeology* 11: 101-116
- Wasylikowa K, Dahlberg J (1999) 2 Sorghum in the economy of the early Neolithic nomadic tribes at Nebta Playa, southern Egypt. In: Veen M van der (ed) *The exploitation of plant resources in Ancient Africa*. Plenum, New York, pp 11-31
- Western AC (1971) The ecological interpretation of ancient charcoals from Jericho. *Levant* 3: 31-40
- Willcox G (1992) Timber and trees: ancient exploitation in the Middle East: evidence from plant remains. *Bulletin Sumerian Agriculture* 6: 1-31
- Willcox G (1996) Evidence for plant exploitation and vegetation history from three Early Neolithic pre-pottery sites on the Euphrates (Syria). *Vegetation History and Archaeobotany* 5: 143-152
- Zeist W van (1991) Economic aspects. In: Zeist W van, Wasylikowa K, Behre KE (eds) *Progress in Old World Palaeoethnobotany*. Balkema, Rotterdam, pp 109-130
- Zeist W van, Bakker-Heeres JAH (1979) Some economic and ecological aspects of the plant husbandry of Tell Aswad. *Paléorient* 5: 161-169.
- Zeist W van, Bakker-Heeres JAH (1982) Archaeobotanical studies in the Levant, 1. Neolithic sites in the Damascus basin: Aswad, Ghoraife, Ramad. *Palaeohistoria* 24: 165-256
- Zeist W van, Bakker-Heeres JAH (1986a) Archaeobotanical studies in the Levant. 3. Late Palaeolithic Mureybit. *Palaeohistoria* 26: 171-199
- Zeist W van, Bakker-Heeres JAH (1986b) Archaeobotanical studies in the Levant. 2. Neolithic and Halaf levels at Ras Shamra. *Palaeohistoria* 26: 151-170
- Zeist W van, Bakker-Heeres JAH (1988) Archaeobotanical studies in the Levant. 4. Bronze Age sites on the North Syrian Euphrates. *Palaeohistoria* 27: 247-316
- Zeist W van, Waterbolk-van Rooijen W (1985) The Palaeobotany of Tell Bouqras, Eastern Syria. *Palaeorient* 11: 134-147
- Zeist W van, Waterbolk-van Rooijen W (1992) Two interesting floral finds from third millennium B.C. Tell Hammam et-Turkman, Northern Syria. *Vegetation History and Archaeobotany* 1: 157-161
- Zeist W van, Waterbolk-van Rooijen W, Bottema S (1988) Appendix 2: Some notes on the plant husbandry of Tell Hammam et-Turkman. In: Loon MN van (ed) *Hammam et-Turkman I. Report on the University of Amsterdam's 1981-84 excavations in Syria*. Istanbul, pp 705-715



**Appendix 1.** Species referred to in the study, their recent distribution and uses. Distribution information is based on author's research in herbaria and field work. Distribution maps are shown in Figs. 21-23.

Taxa	Altitude and Habitat	Distribution	Notes
<i>Capparis decidua</i> (Forssk.) Edgew., ( <i>Sodada decidua</i> Forssk.; <i>Capparis sodada</i> Br.)	0-200 m, wadis and oasis in hot deserts, among savanna-like vegetation	Northeast Africa (Egypt to Ethiopia), Western Asia: Sinai, Arabia, Socotra, S. Iran, Baluchistan, south of the Himalayas in the Upper Gangetic Plain, described from Yemen	The flower buds, „pasi“ are cooked when fresh as a potherb, in Sind also pickled, as are the young fruits, the ripe fruit is eaten. The red pulp is eaten by the Arab children in S. Midian. Young shoots, leaves, roots and fruits are powdered used in treating boils, skin eruptions, rheumatism. The quick-burning wood is used as fuel and occasionally for timber; it is hard, heavy, even-grained and tough, used for making tool-handles, boat-knees, etc.; resistant to termite attack. Often planted as sand binder to arrest spread of deserts (Jacobs 1965; Sundara 1993; Campbell-Thompson 1949).
<i>Capparis cartilaginea</i> Decne. ( <i>C. inermis</i> Forsskal; <i>C. galeata</i> Fresen.; <i>C. sinaica</i> Veillard in Duhamel; <i>C. uncinata</i> Edgeworth)	0-2000 m, ravines, stone sea level walls and rocks of hot deserts, deciduous bushland, often on exposed rock or coral outcrops	Libya (Tripolitanian Sahara), Egypt (Galala, Suez, Kene, Qoseyr, Sinai), Sudan, Ethiopia (Highlands), Somalia (Coasts of the Gulf of Aden, Boorama, Garoowe), Socotra, Kenia (Turkana, Masai, Mombasa), Tanzania (Masai), Arabian Peninsula, south-eastern Iran (Laristan, Baluchistan), west Pakistan (Baluchistan), northwest India (Kathiawar)	It is the "felfel-jibbel" of the Arabs in the Sinai Peninsula, the mountain pepper. The fruit is reported as edible and the dried leaves are chewed against cough in Somalia.
<i>Capparis napaulensis</i> DC. ( <i>C. himalayensis</i> Jafri; <i>C. leucophylla</i> Collett non DC.; <i>C. spinosa</i> auct. non L.)	800-2000 m, wadis and oases in hot deserts, among savanna-like vegetation	Western Himalaya. West Pakistan (Rawalpindi to Jammu and Kashmir), India (Kumaon, Bihar, Himachal Pradesh, Uttar Pradesh) and western Nepal (Kah Gandak, Lasha)	In Himachal Pradesh where both <i>C. sicula</i> ssp. <i>sindiana</i> and <i>C. napaulensis</i> occur, introgressive hybridisation is common and characters intergrade so that the taxa cannot be separated (Sundara, 1993).
<i>Capparis aegyptia</i> Lam. ( <i>C. spinosa</i> L. var. <i>aegyptia</i> (Lam.) Boiss.; <i>C. deserti</i> (Zoh.) Täckh; <i>C. sinaica</i> auct.; <i>C. spinosa</i> L. var. <i>deserti</i> Zohary; <i>C. spinosa</i> L. var. <i>aravensis</i> Zohary; <i>C. murrayana</i> Grah.; <i>C. murrayi</i> auct.)	0-2000 m, walls, rocky ground, steep cliffs. Common in Egypt and Palestine. It is a frequent associate in the <i>Hyparrhenia</i> community	Egypt (Middle Egypt, Sinai), Palestine (Wadi Kelt, Nablus), Saudi Arabia (Jabal Latiz, Wadi Lakus), India (Bombay), Libya (Cirenaica), Turkey (Antalya), Israel (Ksar Gileh, Manara), Lebanon (Beirut), Syria (Ugarit, Maaraba, Damascus, Ayn Dara), southwest Jordan, Iran, Saudi Arabia	Intermediates between <i>C. aegyptia</i> and <i>C. sicula</i> ssp. <i>leucophylla</i> occur in Najran (Saudi Arabia), intermediates between <i>C. sicula</i> ssp. <i>sicula</i> and <i>C. aegyptia</i> occur in Safit near Nablus, Palestine and in Dead Sea Valley, near Mizpe Dragot
<i>Capparis atlantica</i> Inocencio, D. Rivera, Obón and F. Alcaraz ( <i>C. spinosa</i> auct non L.)	0-2000 m, walls, rocky ground, steep cliffs, often also in the vicinity of human dwellings This is the common caper in the Atlas mountains	Morocco (High Atlas. Safi, Tizi n'Test, Asm, Oued Argani), described from Asm (High Atlas)	In Tizi n'Test (Morocco) occur the hybrid of <i>C. ovata</i> with <i>C. atlantica</i> .
<i>Capparis zoharyi</i> Inocencio, D. Rivera, Obón and F. Alcaraz ( <i>C. aegyptia</i> aucts.)	0-200 m, walls, rocky ground, steep cliffs	Spain (Cartagena), Morocco, Algeria, Tunisia	Considered of lesser value by the natives of the area when compared with <i>Capparis sicula</i> .
<i>Capparis mucronifolia</i> Boiss. ssp. <i>mucronifolia</i> ( <i>C. spinosa</i> L.)	0-2000 m, rocky hillsides and cliffs	Saudi Arabia, Oman, UAE, Qatar, Southern Iran (Laristan, Makran, Zahedan), Afghani-	Using not stated.

Taxa	Altitude and Habitat	Distribution	Notes
var. <i>mucronifolia</i> (Boiss.) Hedge & Lamond; <i>C. elliptica</i> Hausskn. & Bornm. ex Bornm. var. <i>maskatensis</i> Hausskn. & Bornm. ex Bornm.; <i>C. spinosa</i> L. var. <i>leucophylla</i> auct. (incl. <i>C. rosanoviana</i> B. Festsch.)		stan (Khyber-pass), Pakistan (Peshawar, Khyber-pass, Baluchistan, Sind), type material was gathered in southern Iran and Mascate; Central Asia (Pamir): Tajikistan(Kadagian) (for <i>C. rosanoviana</i> )	
<i>Capparis orientalis</i> Veillard in Duham. ( <i>C. rupestris</i> Sm.; <i>C. parviflora</i> Gay in herb.)	0-100 m, rocks and cliffs, walls, and human settlements hedges, meadows	Spain, Balearic Islands, Sicily, Malta, southern Italy, Greece, Crete, Lebanon, Libya (Cirenaica, Tripolitania, Kouf National park), Egypt, western Anatolia	In the Aegean islands the fruits are pickled. In Candia the leaves and flower buds are pickled. In Pantelleria near Sicily, it is grown as a crop for flower buds pickles.
<i>Capparis ovata</i> Desf. ssp. <i>ovata</i> ( <i>C. fontanesii</i> DC.; <i>C. spinosa</i> auct. non L.)	0-2000 m, dry rocky slopes in its northern area	Morocco (Fes, Driouch, Taza, Rif), Algeria (Oran, Ahaggar-Tamanraset), Tunisia (Kabylie, Khargued), Libya (Tripolitania), Chad (Gozou)	Using not stated
<i>Capparis ovata</i> Desf. ssp. <i>myrtifolia</i> Inocencio, D. Rivera, C. Obón & F. Alcaraz	500-2000 m, dry rocky slopes	Morocco (Agdz to Ail Saiun, Zaio), Algeria (Ahaggar-Tamanraset / Tezeit, Tassili Djanet), Chad (Gozou, Tibesti)	The women in Chad collect the fruits, mash them and make a sort of gruel by mixing these with milk as a food. The local name is "gozoui".
<i>Capparis parviflora</i> Boiss. ssp. <i>kurdica</i> (Zohary) Inocencio, D. Rivera, C. Obón & F. Alcaraz ( <i>C. ovata</i> Desf var. <i>kurdica</i> Zohary; <i>C. parviflora</i> auct. non Boiss.; <i>C. parviflora</i> Boiss. var. <i>glaberrima</i> Hand.-Mazz.)	450-900 m, rocky places in the mountains, on shady limestone cliffs, in roadside cuttings, on gray sandstone	Iraq (Bilas), Iran (Kerman), Afghanistan (Chakhansur), described from Djebel Sinjar, Iraq (Darvirdikhan)	It has the vernacular Kurdish name "Halabja" in Iraq, where the fruits are eaten (Blakelock & Townsend 1980)
<i>Capparis parviflora</i> Boiss ssp. <i>parviflora</i> ( <i>C. spinosa</i> L. var. <i>parviflora</i> (Boiss.) Boiss.; <i>C. leucophylla</i> DC. var. <i>parviflora</i> (Boiss.) Zohary; <i>C. heteracantha</i> DC. ?)	450-1830 m, rock cliffs, steep rocks and dry stone slopes, in semi-desert	Egypt, Iraq (Kurdistan), southern Iran (Khuzistan, Shiraz, Sistan, Fars), Turkmenia (Ashgabat, Kopet Dagh), Afghanistan (Kabul, Kandahar), Pakistan (Hyderabad, Tandojan), Saudi Arabia UAE	The Persian healers use the boiled roots in olive or sesame oil and white wine for spleen diseases associated to intermittent fever. It has the Persian name "Mara Gira".
<i>Capparis parviflora</i> Boiss. ssp. <i>sphaerocarpa</i> Inocencio, D. Rivera, C. Obón & F. Alcaraz	840-1300 m, rock cliffs, steep rocks and dry stone slopes, in semi desert	Afghanistan (Herat, Shindand, Fariah, Chakhansur)	Intermediates between ssp. <i>parviflora</i> and ssp. <i>sphaerocarpa</i> occur in Afghanistan.
<i>Capparis sicula</i> Veillard in Duham. ssp. <i>herbacea</i> (Willd.) Inocencio, D. Rivera, C. Obón & F. Alcaraz ( <i>C. herbacea</i> Willd.; <i>C. ovata</i> Desf var. <i>herbacea</i> (Willd.) Zohary; <i>C. ovata</i> M. Bieb. non Desf)	100-2000 m, serozems of desert plains, clayey rocky soils, often solonetzic soils, slopes of low mountain ranges, wasteland and walls	Crimea, Turkey (Zonguldak, Samsun, Erzurum, Osmaniye to Adana, Kars, Hakkari), Armenia, Georgia, Azerbaidjan, Northern Iran, Turkmenia (Kopet Dagh), Afghanistan (Takhar, Khanabad in Kunduz), Pakistan (Chitral), Mongolia (Gobi)	The flower buds are of nutritive value known under the name capers, consumed locally in many parts of the Caucasus; pickled for industrial purposes in the eastern part of Ciscaucasia and in Dagestan. In southern Armenia the ripe fruit is eaten raw. In the Fergana Valley the fruit is also eaten raw and large quantities are stored for the winter. The seeds are used for the extraction of the oil (Bobrov 1970)

Taxa	Altitude and Habitat	Distribution	Notes
<i>Capparis sicula</i> Veill. in Duham. ssp. <i>leucophylla</i> (DC.) Inocencio, D. Rivera, C. Obón & F. Alcaraz ( <i>C. leucophylla</i> DC.; <i>C. leucophylla</i> DC. var. <i>microphylla</i> (Ledeb.) Tackh.; <i>C. spinosa</i> L. var. <i>pubescens</i> Zohary)	0-250 m, wadis and oases in hot deserts, in clay and gravelly soils, on dry gypsaceous hills, on slightly saline soils, on ditch sides	Iraq: Common in the dry steppe zone and desert region), Jordan, Palestine, Southern Iran, Afghanistan (Bahlan province, Morghab river in Paropamisos Mts.), erroneously recorded from Egypt, Saudi Arabia and Yemen	In Iran the plant is the source of many local herbal remedies for snake-bite, thus explaining the local Persian name "Mar Gir" and "Mar Gaz" (snake bite) and others such as Alaf-i Mar. The Bakhtiari People in Iran pickle the young fruit in vinegar. In Iraq it receives the Arab name of "Shafailah" and the fruit is eaten by men, the plant by camels (Blakelock & Townsend 1980).
<i>Capparis sicula</i> Veillard in Duham. ssp. <i>mesopotamica</i> Inocencio, D. Rivera, C. Obón & F. Alcaraz ( <i>C. spinosa</i> aucts. non L.; <i>C. ovata</i> Desf. var. <i>palaestina</i> Zohary pp.)	0-2300 m, silty ground on limestone, sandy plains, on gravelly soil, often near irrigated fields, walls and dry ditches on alluvial plains	Eastern Palestine, Syria (near Damascus, Afri Dara), Jordan, Yemen, Saudi Arabia (wide-spread), Iran (Zagros, Tehran), Iraq (common in the lower forest zone and on the alluvial plain in the desert)	It has the vernacular name "Shafailah" in Saudi Arabia and Iraq and "Kabar" in Iraq (Blakelock & Townsend 1980). In Iraq the medicinal properties of the root are still recognized by the Badawin, a decoction of the root taken orally being reputed as an alleviant for rheumatism (Blakelock & Townsend 1980).
<i>Capparis sicula</i> Veillard in Duham. ssp. <i>sindiana</i> Inocencio, D. Rivera, C. Obón & F. Alcaraz ( <i>C. nepalensis</i> Wall.; <i>C. obovata</i> Royle)	1000-2000 m, walls, hedges, meadows and human settlements	Afghanistan (Baraki Barak), Turkmenistan (Syr-Dagh), Pakistan (Karachi, Kharipur, Punjab), India (Mahableshwar, Kunawar), Nepal	Camel and goat graze on it, fruits and buds are sometimes pickled in Pakistan, fruits are pickled by the natives in Punjab (Pakistan). In India young and ripe fruits are consumed; berries are boiled and eaten with curd. Unripe berries are pickled. Leaves used as fodder for goats, camels and sheep. Infusion of leaves used in treating gonorrhoea. In Ladakh a decoction of the leaves is drunk against hyperacidity (Sundara 1993).
<i>Capparis sicula</i> Veillard in Duham. ssp. <i>sicula</i> ( <i>C. spinosa</i> aucts. non L.; <i>C. spinosa</i> L. var. <i>canescens</i> Cosson; <i>C. ovata</i> Desf. var. <i>palaestina</i> Zohary pp.)	0-1000 m, walls, hedges, meadows and human settlements	Spain, southern France. Morocco (Fes, Sidi Karcem, Kdnichet), Algeria (Oran), Sicily, Greece, Turkey (Hakkari, Corum, Dardanelles, Ankara, Mersin, Denizli), Cyprus, Palestine, Libya (Cirenaica), Saudi Arabia (Shiraz)	Utilization of flower buds of stems and unripe fruits for pickles, fruits externally applied for the treatment of headaches and piles in Anatolia (Öztürk & Özçelik, 1991).
<i>Capparis x spinosa</i> L. ( <i>C. sicula</i> Veillard x <i>C. orientalis</i> Veillard)	0-250 m, cultivated as food crop, it occurs also in disturbed habitats	Southern France, Eastern Spain, Balearic Islands, Malta, Sicily, Southern Italy, Greece (Rhodos, Simi, Tilos), Malta, Morocco (Tan Tan), Turkey (Marmaris Peninsula, Pamukkale, Eskisehir), Lebanon (Saida)	Flower buds widely used as food, widely grown in Spain, France and Italy.