Report on Iter Mediterraneum I

Ursula Matthäs & Benito Valdés

Introduction

As decided in Istanbul (1986) and Sevilla (1987), the first Iter Mediterraneum took place in SE Spain from the 12th of June to the 2nd of July 1988.

It was organized by B. Valdés and S. Talavera (Sevilla), who selected a wide area of SE Spain, covering part of the provinces of Granada, Almería and Jaén, with some excursions to the provinces of Málaga, Albacete and Murcia. The basic itinerary is shown in Fig. 1.

The following took part in the expedition.

Local organizers:

B. Valdés & S. Talavera, Departamento de Biología vegetal y Ecología, Universidad de Sevilla.

Senior participants:

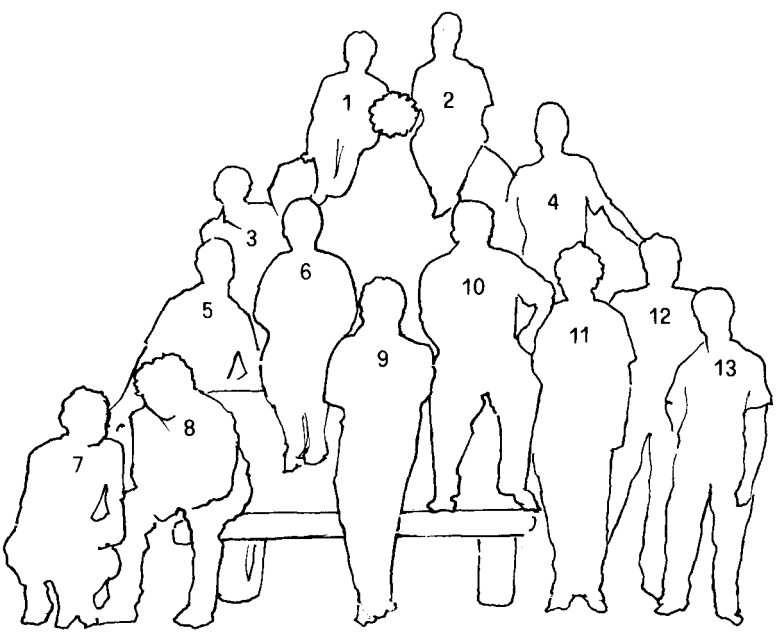
G. Alziar, Jardin botanique, Nice.
D. Jeanmonod, Conservatoire et Jardin botaniques, Genève.
N. Galland, Institut de Botanique, Lausanne.
U. Matthäs, Botanischer Garten und Botanisches Museum, Berlin.

Junior participants:

V. Stevanovic, Institute of Botany, Faculty of Sciences, Belgrade.
P. Minissale, Istituto di Botanica, Università di Catania, Catania.
S. Fici, Dipartimento di Scienze botaniche, Palermo.
B. Foggi, Dipartimento di Biologia vegetale, Università di Firenze, Firenze.
M. Watson, Plant Science Laboratories, Whiteknights, University of Reading.
P. Hinz, Conservatoire et Jardin botaniques, Genève.

Assistant:

J. M. Romero, Department of Plant Biology and Ecology, The University, Sevilla.



Members of the first OPTIMA EXPEDITION. 1, P. Hinz, Genève. 2, N. Galland, Lausanne. 3, G. Alziar, Nice. 4, D. Jeanmonod, Genève. 5, M. Watson, Reading. 6, U. Matthäs, Berlin. 7, P. Minissale, Catania. 8, V. Stevanovic, Belgrade. 9, B. Foggi, Firenze. 10, S. Talavera, Sevilla. 11, S. Fici, Palermo. 12, B. Valdés, Sevilla. 13, J. M. Romero, Sevilla. (photo S. Fici).

A preliminary seminar was held in Sevilla on June 13th. It included a lecture by Dr. F. Díaz del Olmo (Sevilla) on Quaternary Geomorphology of the SE of the Iberian Peninsula, and a second one by Dr. F. Valle (Granada) on the Vegetation of E Andalucía, whose text is included in this volume.

The organizers had selected two main working centres: Guadix (Granada) and Santiago de la Espada (Jaén), from where daily excursions led the participants into some botanically very poorly known areas of SE Spain (see Figs. 2 and 3). Even the programmed free days were used by some of the participants to collect plant material in areas not originally included in the programme.

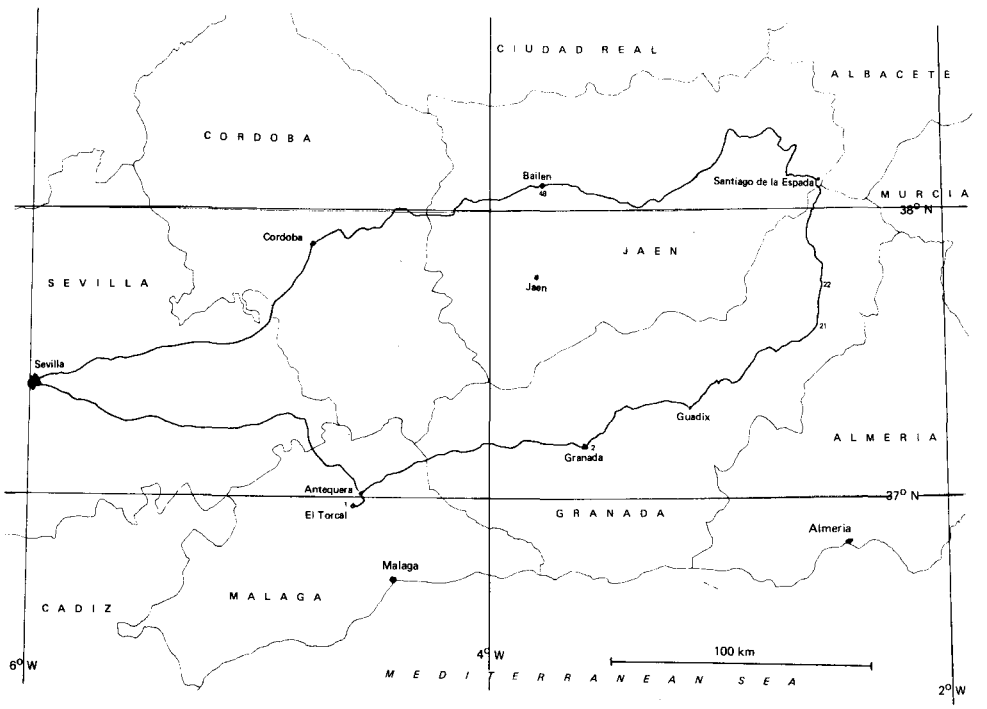


Fig. 1. Basic itinerary followed during Iter Mediterraneum I. For details, see Figs. 2 and 3.

Two laboratory rooms were arranged for, one in Hotel Mulhacén, Guadix, the other in a private house, used as a hostel, in Santiago de la Espada. Their equipment comprised plant presses, cardboard boxes, a stereo-microscope, chemicals for fixation, paper envelops, polythene bags and other facilities, including a wide selection of national, regional and local floras, check-lists, field-guides and papers on the flora and vegetation of the areas covered by the expedition. Some of these items had been deposited beforehand at both centres by the local organizers.

The plant material was prepared in the field by the members of the expedition, on every first or second stop, by using latticed wooden field presses. Every evening, specimens were numbered and transferred to the big plant presses in the lab. The wet drying paper was removed and dried every day by the assistant, while the members of the expedition were working in the field.

Itineraries

The participants left Sevilla on the 14th of June. On their way to Guadix, the first collecting centre, they visited the karstic limestones of the "Parque Nacional El Torcal de Antequera" (1). This is an almost completely isolated limestone formation of unique scenique beauty situated in the N of Málaga Province and extending west through the Sierra de la Chimenea.

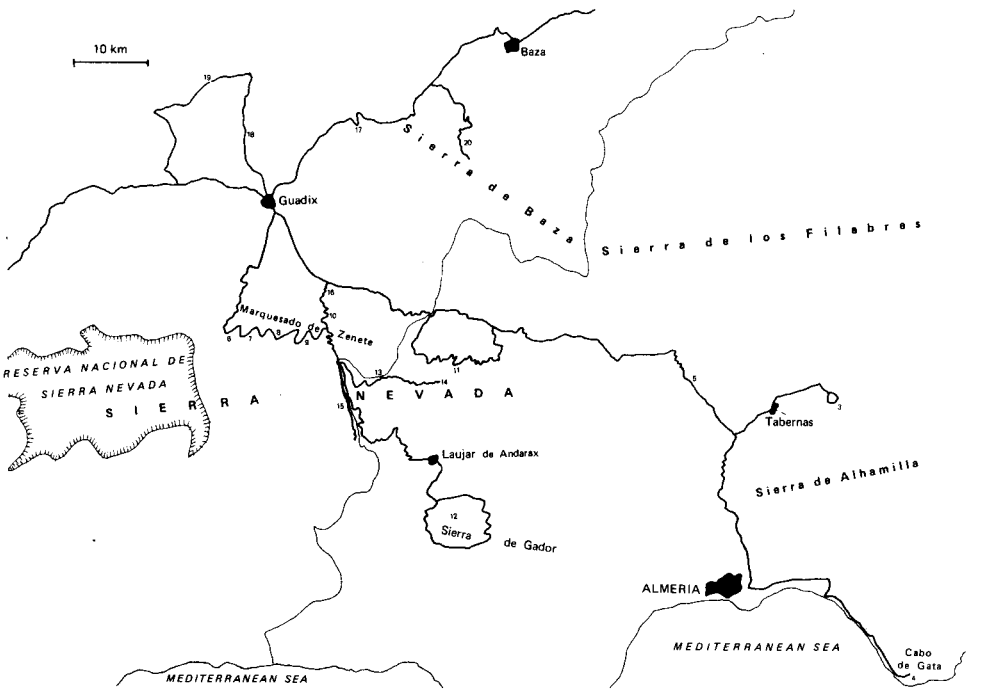


Fig. 2. Itineraries followed from Guadix. Only the main collecting sites are numbered. The numbers correspond to those in brackets in the text.

This area has been visited by many botanists since, around in the middle of last century, it was first explored by Prolongo, Boissier and Reuter. This stop resulted in the collecting of 118 gatherings including: *Nepeta amethystina* var. *anticaria* (so far only known from Torcal de Antequera), *Saxifraga reuteriana*, *Dianthus anticarius*, *Linaria anticaria*, *L. oblongifolia*, *Saxifraga biternata* (Fig. 4), *Silene andryalifolia* and *Biscutella megacarpea*. The distributional area of these taxa is centered mainly on the Serrania de Ronda mountain system to which the Torcal de Antequera belongs.

(1) Numbers in brackets refer to the localities indicated on the maps

These plants, together with somewhat more widespread species, such as *Iris foetidissima*, *Cerastium gibraltaricum* and *Scabiosa turolensis*, made this first collecting site attractive and encouraged future work.

The party continued on to Guadix where it arrived in the evening, having made a short visit to the Alhambra de Granada in route.

This second stop provided the opportunity to collect eight numbers from the calcareous stone walls of the moorish palace, including *Chaenorrhinum villosum* subsp. *granatensis*.

During the whole expedition the weather was exceptionally wet and cold for this time of the year and this partially affected the expedition's itinerary.

The driest parts of Almería were visited first, because in so doing some plants could still be collected in flower, which would have been difficult even one week later in this area, and also because the lack of clouds in these semi-desert pseudosteppic areas W and S of Almería promised fine weather.

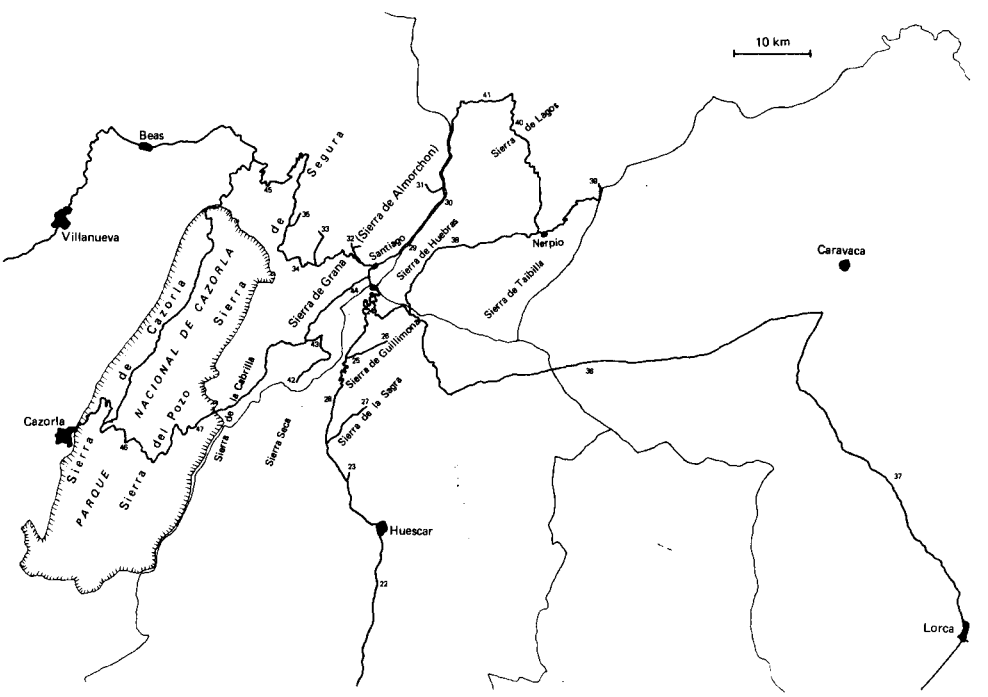


Fig. 3. Itineraries followed from Santiago de la Espada. Only the main collecting sites are numbered. The numbers refer to those in brackets in the text.

On the 15th of June the itinerary included the Gergal, Benahadux and Tabernas gypsum areas as well as the Cabo de Gata. These are fairly well known areas, since most Spanish and many foreign botanists have visited the gypsum areas of Almería during this century, attracted by the richness and rarity of its flora, the volcanic areas of the Cabo de Gata having received similar attention.

Between Tabernas and Venta de los Yesos (3) much of the vegetation was already very dry, but the shrubs and some other plants were still fit for being pressed.

Some interesting gypsophilous plants, such as *Helianthemum squamatum*, *Frankenia thymifolia*, *Herniaria fruticosa* subsp. *erecta* and the rare annual *Chaenorrhinum grandiflorum* were collected.

Near the lighthouse at Cabo de Gata (4), the vegetation is dominated by stands of *Chamaerops humilis*. The visit resulted in the collection of 40 numbers including *Dianthus charidemi*, *Antirrhinum charidemi* and *Linaria benitoi*, all three endemic to the Cabo de Gata area; the latter was previously known only from a single locality several kilometres to the east of Cabo de Gata proper.

Fig. 4. *Saxifraga biternata* Boiss. & Reuter, endemic to Serrania de Ronda, was collected in Torcal de Antequera (photo U. M.)

Between Gergal and Venta de Cañicas (5), on somewhat salty soils, the interesting species collected compensated for the low number of gatherings. *Euzomodendron bourgaeanum*, a member of the *Brassicaceae* endemic to this area of Almería, *Haloxylon articulatum*, *Salsola genistoides*, *Diplotaxis lagascana*, and *Notoceras bicorne* are amongst the plants collected there.

The following day, the 16th of June, was devoted to "El Marquesado". This is a region with a relatively natural and undisturbed vegetation in the Granada Province, close to the border of Almería, which covers the lower parts of the N slopes of the Sierra Nevada and is formed exclusively by shale rocks and soils.

It is very poorly known, and was expected to be one of the more interesting sites of the expedition. Altogether, 391 gatherings were made. The first collecting site was at "La Dehesa" (6), near Jerez del Marquesado. This is a rather arid area of shales, covered by a

forest of *Pinus pinaster*. A large number of Mediterranean species were collected, including: *Linaria aeruginea*, *Scorzonera angustifolia*, *Phlomis lychnitis* and *Genista umbellata*. *Bufonia tenuifolia* was, perhaps, the most interesting finding.

The next area investigated was on the hillsides and stream banks of the "Arroyo de Alcazar" (7), at an altitude of 1600 m. The wide variety of habitats enabled the collection of a high number of plants, from *Montia fontana* subsp. *variabilis*, sampled from the stream, to *Alyssum granatense*, growing in the driest areas. Interesting plants such as *Arenaria pungens*, *Adenocarpus decorticans*, *Antirrhinum rupestre*, *Centaurea sagredoi* subsp. *speciosa* and *Leontodon longirostris* were also collected.

Another locality a little further on, at Cerro de los Pinos in the administrative area of Alquite (8) allowed the collecting of several interesting plants, including the diminuitive *Minuartia hamata*.

The most interesting area visited was, however, the Gallego gorge (9), between 1650 and 1700 m of altitude. The rock communities were dominated by *Sarcocapnos crassifolia* subsp. *speciosa* together with *Antirrhinum rupestre* and *Linaria verticillata*, the two latter endemic to the Sierra Nevada and adjacent mountains. Almost 60 numbers were collected there, including *Verbascum nevadense*, *Cotoneaster granatensis*, *Genista versicolor* and *Dianthus pungens* subsp. *brachyanthus*. A short stop between Aldeire and the gorge of Pasillos (10) completed the day's itinerary.

The 17th of June was devoted to the northern areas of the Sierra Nevada in Almería (11). As far as the organizers were aware of, this area is one of the most poorly botanized in Spain. It was apparently studied only once, apart perhaps from a few other short excursions. The mountain rivulets bordered by wet alpine meadows form a great contrast with the aridity of the surrounding areas which are clearly thermo-mediterranean and covered by forests of *Quercus rotundifolia* (often very disturbed, and partly replaced by *Pinus* forests). This area forms the northern limit of the Sierra Nevada in the Almería Province, and is nestled below the peaks of Pico del Almirez. The lowest areas visited were at c. 1100 m of altitude, and the highest at 1980 m, just below the Cerro del Almirez. Geologically the area is dominated by shales. All plants collected from the highest areas were typical "Nevadians", and some were collected for the first time in the area. The most significant species were *Aquilegia vulgaris* subsp. *nevadensis* (Fig. 5), *Pinguicula nevadensis*, *Gentiana verna* subsp. *penetii*, *Androsace vandellii*, *Leucanthemopsis pectinata*, *Primula veris*, *Nepeta amethystina* subsp. *laciniata* and *Viola parvula*.

On the following day (the 18th of June) a long excursion was made to the Sierra de Gador (12), in the SW of the Almería Province. The Sierra de Gador is a rather impressive mountain system formed of limestones and shales. It is completely isolated from the Sierra Nevada and other neighbouring mountain systems by the valley of the river Andarax to the north and east, and by the valley of the river Adra to the west. To the south it extends to the coastal plains of Almería. A large and varied collection of 256 gatherings plus several extra "bis" numbers were made, including famous plants such as *Thymus membranaceus* (Fig. 6), *Helianthemum cinereum*, *Helianthemum croceum*, *Echinospartum boissieri*, *Lavandula lanata*, *Dianthus broteri*, *Phlomis composita* (Fig. 7), *Verbascum giganteum* and *Ononis aragonensis*.

Above 1400 m the oro-mediterranean scrub formations are dominated by the spiny cushions of *Erinacea anthyllis*, *Vella spinosa* and *Bupleurum spinosum*. The highest point reached was the Lote de Bardagí at 2050 m. On limestone, the very poor alpine vegetation is dominated by *Festuca nevadensis*, *F. hystrix* and *Koeleria crassipes*. A variant of *Linaria*

Fig. 5. *Aquilegia vulgaris* L. subsp. *nevadensis* (Boiss. & Reuter) T. E. Díaz, collected in the northern slopes of Sierra Nevada, Abrucena (photo U.M.).

Fig. 6. *Thymus membranaceus* Boiss., endemic to SE Spain, is another of the interesting plants collected in Sierra de Gador (photo U.M.).

aerugineu (a form which is absent from the neighbouring mountains), *Arenaria armerina* and *Euphorbia flavicoma* were also collected here.

On the 19th of June the Sierra Nevada was revisited, but this time its highest areas, in order to complete the collections in this mountain range. The expedition reached Puerto de la Ragua, at 2000 m where it split in two. One group visited El Chullo (13) and the Cerro del Almirez (14), while the other visited lower areas on the southern slopes of the Sierra Nevada (15), down to c. 1400 m. A total of 260 gatherings were made. Interesting findings include the rare *Draba lutescens*, collected in very humid alpine meadows at El Chullo, and *Polygonatum odoratum*, collected in deep crevices at the Cerro del Almirez (the only known locality of this species in the Almería Province).

Fig. 7. *Phlomis composita* Pau occurs in S Spain and N Morocco. It was collected in Sierra de Gador, Almería (photo U.M.).

The 20th of June was to be a "resting day". However, the members of the expedition decided to take the opportunity to collect on the Guadix plateau. This was not included in the programmed excursions as at this time of the year the area is usually too dry for reasonable collecting. 1988 was, however, an exceptionally wet and cold year so that it was still possible to see many plants flowering even at the end of June. 116 numbers were collected in areas surrounding Guadix: La Calahorra (16), Gor (17), between Benalua de Guadix and Fonelas (18), and Huelago (19), on plains and in dry river-beds (ramblas), on triasic limestone, shales and gypsaceous soils. Amongst the plants collected, *Carduncellus hispanicus* subsp. *araneosus*, *Astragalus clusii*, *Launaea pumila*, *Ononis speciosa* (Fig. 8), *Salvia lavandulifolia* and *Leysera leyseroides* were the most characteristic.

A large collection from the Sierra de Baza (20) on the 21st of June completed the gatherings made from Guadix. 446 numbers, together with several "bis" samples, were

Fig. 8. *Ononis speciosa* Lag. is one of the species growing in the neighbourhoods of Guadix (photo U. M.).

Fig. 9. *Polygala boissieri* in Sierra de Baza, on the way to Santa Barbara, in an area formed by dolomite and limestone (photo U. M.).

collected from the base to the very top of the Sierra, at altitude ranging from 1120 to 2200 m. In low areas, old cultivations on basic soils and *Pinus halepensis* forests were explored. *Linum suffruticosum*, *Teucrium pseudochamaepytis*, *Convolvulus lineatus*, *Teucrium webbianum*, *Klasea pinnatifida*, *Marrubium xwillkommii* and *Ziziphora hispanica* were collected, together with several widespread weeds. The way up to Santa Barbara, an alpine area covered by meadows, led through dolomite and limestone. *Dorycnium pentaphyllum*, *Arctostaphylos uva-ursi*, *Euphorbia nicaeensis*, *Aphyllanthes monspeliensis*, etc., were collected on dolomite, and *Polygala boissieri* (Fig. 9), *Scabiosa turolensis*, *Cynoglossum nebrodense*, *Bupleurum spinosum*, etc., on limestone.

In Santa Barbara, between 2000 and 2200 m, on dolomite, *Campanula hispanica*, *Aethionema saxatile*, *Pterocephalus spathulatus*, *Linaria aeruginea* (Fig. 10), *Scutellaria orientalis* subsp. *hispanica* (Fig. 11), *Lithodora fruticosa*, *Ononis aragonensis*, and many other species were collected. The rare *Andryala agardhii*, only known from the Sierra de Baza and the Sierra de la Sagra, was also found.

Fig. 10. *Linaria aeruginea* (Gouan) Cav. subsp. *aeruginea* in Sierra de Baza. Many colour variants of this polymorphic species were collected during the expedition (photo U. M.).

The expedition left Guadix on the 22nd of June, bound for its second main working centre, Santiago de la Espada. This is a small village close to the Rio Zumeta gorge, on the ridge of a wide calcareous plateau in the south-east of the Jaén Province.

Three main collecting sites were visited on the way from Guadix to Santiago. The first, near Cullar de Baza (21), on salty soils, produced several halophytes. *Limonium cymuliferum*, *Frankenia pulverulenta*, *Sphenopus divaricatus*, *Sarcocornia fruticosa*, *S. perennis*, *Arthrocnemum macrostachyum*, *Suaeda maritima*, *S. vera* and the hybrid *Sonchus xnovocastellanus* (recently recorded from this locality) are some of the 51 collected species.

A second stop was made near Galera (22), in the centre of a wide area covered by

gypsum hills. Typical gypsophilous plants such as *Ononis tridentata*, *Herniaria fruticosa* and *Helianthemum syriacum* subsp. *thibaudii* were collected, together with 27 other species.

The third collecting site was on the Sierra de Moncayo near Huescar (23), a calcareous formation south of the Sierra de la Sagra, where the vegetation was already very dry. *Ononis fruticosa*, *Linum sufrfuticosum* and *Coris monspeliensis* are notable amongst the 173 Mediterranean species collected.

Fig. 11. *Scutellaria orientalis* L. subsp. *hispanica* (Boiss.) Greuter & Burdet was collected in Sierra de Baza and Sierra de la Saga; it occurs also in Sierra Nevada (photo U. M.).

For the purpose of the expedition, Santiago de la Espada was strategically well situated. It lies at an altitude of 1430 m and is surrounded to the north and west by the most important mountain formations of the Jaén Province (Sierra de Segura, Sierra de Cazorla, Sierra del Pozo), to the south by some poorly known mountain systems of the Granada Province (Sierra de Guillimona), and to the east by the gorge of the river Zumeta and several calcareous mountains of the Albacete Province.

The Sierra de Guillimona, in the Granada Province, a massive limestone formation with two very characteristically shaped rocks in the summit area, was visited on the 23rd of June, and 232 gatherings plus several extra "bis" numbers were collected there.

The first collecting site was in the Torilla gorge (24), between 1400 and 1500 m. The gorge is dominated by spiny members of the *Quercion* alliance. Among the most interesting plants collected are *Anchusa undulata* subsp. *granatensis*, *Centaurea granatensis* (Fig. 12), *Sarcocapnos baetica* (Fig. 13), *Phyteuma hemisphaericum*, *Daphne laureola* subsp. *latifolia* and *Ionopsidium prolongoi*.

On the way to the Cuerda de Mirabetes (25), between 1500 and 1700 m, *Onosma tricerosperma* subsp. *hispanica*, *Anthericum liliago* and *Serratula nudicaulis* were the most notable species collected. In the higher parts, at about 1800 m (26), *Draba lutescens* was

Fig. 12. *Centaurea granatensis* Boiss. ex DC., collected in Sierra de Guillimona, Granada (photo U. M.).

Fig. 13. *Sarcocapnos baetica* (Boiss. & Reuter) Nyman, endemic to Sierra de Segura and Sierra de Guillimona (photo U. M.).

again collected, together with several other interesting plants.

The whole of the 24th of June was devoted to the Sierra de la Sagra (27), with a short stop en route at La Losa (28), all in the Granada Province. The expedition followed a forestry road up to 1850 m, then continued on foot to the summit at 2300 m. The path runs along a dry stream-bed to reach the saddle between the Sagra Grande and the Sagra Pequeña, and continues to the left along the watershed of the Sagra Grande up to the summit. At lower altitudes the slopes were covered by pine forest, where *Centaurea granatensis*, *Antirrhinum australe*, *Ajuga chamaepitys* and *Viscum album* subsp. *austriacum* were collected. Between 1700 and 2000 m a large number of species were encountered, including *Lactuca perennis* subsp. *granatensis*, rather common in the screes.

The cliffs near 2000 m were covered with several characteristic rupiculous species such as *Globularia spinosa* (Fig. 14), *Sarcocapnos baetica* subsp. *integrifolia*, *Moehringia intricata* and *Silene saxifraga*. The higher parts, between 2000 and 2300 m, are dominated by screes and stony slopes. They are covered by cushion scrub, mainly of *Vella spinosa*, *Ptilotrichum spinosum* and *Erinacea anthillys*. The most interesting plants of the mountains are found there, which include *Biscutella glacialis*, *Platycapnos saxicola*, *Silene boryi*, *Pterocephalus spathulatus* and a wide range of colour forms of *Linaria aeruginea*, including pinkish, yellowish and reddish variants.

On the way back to Santiago, a halt at La Losa (28), still in the Granada Province, allowed collecting the rare *Arceuthobium oxycedri*, a parassite on branches of *Juniperus oxycedrus*.

The interesting gorge of the Rio Zumeta (29-30), between 950 and 1400 m, was visited on the 25th of June. Plants were collected in both Jaén and Albacete Provinces, which are separated by the river Zumeta. The itinerary also crossed the neighbouring areas of Marchena (31) and Santiago de la Espada, in the Sierra de la Grana.

In the impressive gorge of the Rio Zumeta aquatics such as *Potamogeton densus* and *Zannichellia palustris* were collected, together with rupicolous species from the high cliffs of the gorge. *Silene saxifraga*, *Hypericum ericoides* (Fig. 15) and *Viola cazorlensis* were amongst 173 gatherings made all along the gorge, which were complemented by 78 numbers collected in the Sierra de la Grana (32). One of the most interesting excursions of the whole expedition was made on the 26th of June on the Sierra de Segura, in the neighbourhood of Poyotello (33). This village is situated on a plateau which ends in the deep gorge of the river Segura, with very steep limestone cliffs where 65 gatherings were made. In the higher parts of the cliffs, *Linaria anticaria* var. *cuartonensis*, *Primula vulgaris*, *Hepatica nobilis* and *Geranium cataractarum*, were among the taxa collected. A population of several thousand plants of *Pinguicula vallisneriifolia* covers the most humid spots at the bottom of the cliffs, and *Atropa belladonna*, *Orobanche caryophyllacea* (Fig. 16), *Aquilegia vulgaris*, *Thalictrum speciosissimum*, etc. grow in somewhat nitrified places on the valley floor.

Two other collecting sites, both on limestone Covacho de la Cañada near Pontones (34), and between Pontones and El Campillo (35), completed the programme of this day. *Carduus platypus* subsp. *granatensis* (Fig. 17), *Genista pseudopilosa*, *Filipendula vulgaris*, *Carduncellus cuatrecasasii*, *Armeria villosa* subsp. *longearistata* and about 40 other species were collected at these two localities.

The 27th of June was the second "resting day" of the expedition. It was raining and some of the members had to remain indoors and help the assistant to exchange blotting papers and hang them up to dry with the support of a roaring fire lighted to the improvised

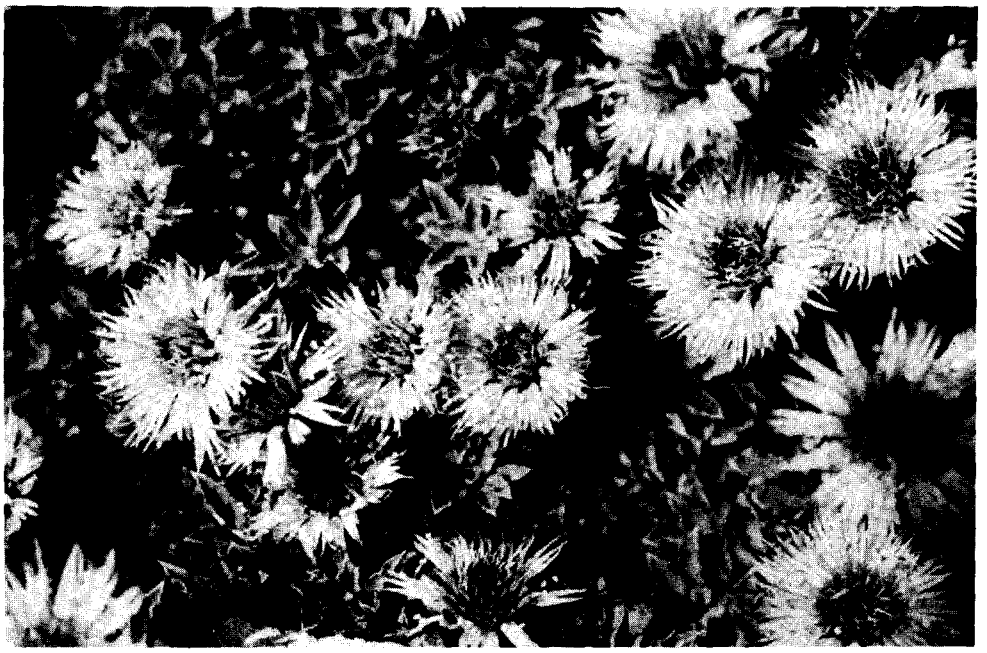


Fig. 14. *Globularia spinosa* L., Sierra de la Sagra (photo U. M.).

Fig. 15. *Hypericum ericoides* L., Sierra de Segura: Sierra de Huebras (photo U. M.).

laboratory. The rest of the party decided to visit the dry gypsum areas of the Murcia Province. They travelled through La Puebla de Don Fadrique (Granada Province), Almaciles (Granada) and Casablanca (Murcia) (36). *Helianthemum asperum, Echium asperrimum, Klasea flavescens* subsp. *leucantha* and 49 other species were collected from limestone with a low content of gypsum during this journey.

The group then moved southwards to Caravaca and Lorca. On the gypsum soils between Caravaca and Lorca (37), in pseudosteppic vegetation dominated by *Ononis tridentata, Salsola genistoides* and *Stipa tenacissima*, almost 40 gypsophilous species were collected, including *Limonium echioides* and *Matthiola parviflora.*

Fig. 16. *Orobanche caryophyllacea* Sm., Poyotello, Sierra de Segura (photo U. M.).

The 28th of June was devoted to the area of Nerpio in the SW of Albacete. This is a poorly known region, probably because its dry limestone areas do not particularly attract botanists.

The excursion stopped at the Sierra de las Huebras (38), the areas around Nerpio (39), the Sierra de Lagos (40), and the Rio Segura gorge (41). Interesting plants collected include *Satureja cuneifolia* subsp. *gracilis, Knautia subscaposa* and *Ephedra nebrodensis.*

Even more interesting was the route followed on the 29th of June when the Sierra Seca was visited (42). This is a high limestone mountain range which forms an extension of the Sierra de Segura. 110 numbers were collected in its higher parts, at about 1800 m. *Arenaria armerina, Koeleria crassipes* subsp. *nevadensis, Saxifraga rigoi, Chaenorrhinum macropodum* subsp. *degenii, Erysimum linifololium* subsp. *cazorlense, Andryala agharadii, Saxifraga camposii* subsp. *leptophylla* and *Leucanthemopsis pallida* subsp. *spathulifolia* are some of the most interesting plants growing on the cliffs and stony places amongst the semi-alpine cushion-plant communities. A stop near Santo Domingo

Fig. 17. *Carduus platypus* Lange subsp.*granatensis* (Willk.) Nyman, endemic to C and S Spain, in the Sierra de Segura (photo U. M.).

Fig. 18. *Halimium atriplicifolium* (Lam.) Spach near Hornos, Jaén (photo U. M.).

(43) and another at La Matea (44), on the way back to Santiago de la Espada, completed the day.

The Sierras de Cazorla and del Pozo were visited on the 30th of June. They are, perhaps, the best known mountain ranges in the Jaén Province, although many areas around them are still poorly collected. Together they form an impressive parallel limestone system running NE to SW.

The itinerary ran through part of the Sierra de Segura, descending to Hornos, Pantano del Tranco, and of the Sierras de Cazorla and del Pozo, to reach the Altos del Infierno, again in the Sierra de Segura. 177 numbers plus several "bis" numbers were collected.
Near Hornos (45), on basic soils within the pine forest, *Hippocrepis scabra*, *Halimium atriplicifolium* (Fig. 18), *Cytisus patens* and *Silene legionensis* were collected, together with several widespread Mediterranean species. *Nepeta tuberosa* subsp. *gienensis*, *Digitalis obscura* and *Sonchus maritimus* subsp. *aquatilis* were collected in the Sierra de Cazorla (46). The most interesting plants were gathered at the Sierra del Pozo (47). They include *Doronicum plantagineum*, *Monotropa hypopitys* (which has here its most southerly locality), *Geum sylvaticum*, *Sisymbella aspera* and *Anthyllis ramburii*.

The expedition left Santiago de la Espada on the 1st of July. A short stop at Bailen (48), in the Jaén Province, permitted to collect some summer-flowering plants on chalk. The visit to the mosque of Córdoba, on the way to Sevilla, rounded off the field expedition.

Collections

In spite of the bad weather (the expedition experienced several really wet days, a phenomenon rather unexpected at that time of the year in SE Spain), over 3233 vascular plant gatherings (their numbering runs from 1 to 3003, with several "bis" numbers) from 106 localities, summarized into 48 collecting areas here, were made during the expedition, with an average of eight duplicates.

During the closing seminar, held in Sevilla on the 1st of July, the members of the expedition agreed to segregate 9 main sets of duplicates, to be deposited at the following institutions:

1. Departamento de Biología Vegetal y Ecología (formerly Departamento de Botánica), Universidad de Sevilla (original set).
2. Conservatoire et Jardin botaniques, Genève.
3. Dipartimento di Scienze botaniche, Palermo (*Herbarium Mediterraneum*).
4. Jardin botanique, Nice.
5. Plant Science Laboratories, University of Reading.
6. Botanischer Garten und Botanisches Museum, Berlin.
7. Institute of Botany, Faculty of Sciences, Belgrade.
8. Istituto di Botanica, Università di Catania.
9. Dipartimento di Biologia vegetale, Università di Firenze.

A tenth set of duplicates was set aside for specialists. The *Festuca*, *Carex* and *Armeria* specimens of this set were sent to M. Kerguélen (La Minière), Dr. Luceño (Madrid) and Dr. Nieto Feliner (Madrid), respectively.

Arrangements for the identification of the material collected as well as for the preparation of the present volume were also made during this seminar.

Department of Plant Biology and Ecology (formerly Department of Botany), Sevilla, separated the duplicates, which were sent to the recipient institutions at the end of July.

The musci (46 gatherings) and the lichens (47 gatherings) were taken care of by S. Fici, who provided for their identification and labelling, and for the distribution of duplicate sets. The original set is being kept at the *Herbarium Mediterraneum* in Palermo, with main duplicate sets (in sequence) in Sevilla, Genève, Berlin, etc.

English texts of label data were corrected by M. Watson. C. Romero (Sevilla), to whom the members of the expedition and the authors of the various accounts are much indebted, computed the data-base for the specimen check-lists to follow.

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