

**A NEW SPANISH SPECIES OF THE GENUS *ACYRTHOSIPHON*
(HOMOPTERA, APHIDIDAE) LIVING ON *ECHINOSPARTIUM*
(LEGUMINOSAE)**

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ABSTRACT

We describe the parthenogenetic apterae of *Acyrtosiphon ericetorum* H.R.L., of which only the oviparae and males living on *Genista* were previously known. We also describe a new species of the same group: *Acyrtosiphon echinospartii* sp. nov. from parthenogenetic apterae and alatae found on *Echinospartium lusitanicum* in Orense province, Galicia (NW Spain). We comment on the taxonomic status of both species, which belong to a group of species of *Acyrtosiphon* that live on Leguminosae and are similar to *Acyrtosiphon pisum*.

1. INTRODUCTION

On the 17th May 1978, we collected a sample of aphids from *Echinospartium lusitanicum* at Ginzo de Limia (Orense province, Galicia), UTM: 29T.PG.06, at a height of 620 m. above sea level. The sample comprised 14 parthenogenetic apterae and one alata, clearly belonging to the genus *Acyrtosiphon*.

They were identified, using EASTOP'S Key (1971), as *Acyrtosiphon ericetorum* Hille Ris Lambers, 1959 of which only the oviparae and males were previously known, albeit with certain reservations, as:

- 1) In the genus *Acyrtosiphon*, the oviparae are very similar to the viviparae, though not identical.
- 2) Certain measurements did not fit, which could be due to the differences referred to in (1) or to real specific differences.

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- 3) Our specimens showed cephalic spinal tubercles, not mentioned by EASTOP (1971), or by HILLE RIS LAMBERS (1959) in their descriptions of the species, but which could be present on specimens of the type series.

In any event, our sample was interesting for the following reasons:

- a) The aphids may be of a new species as yet undescribed, or
- b) If they belonged to *A.ericetorum*, they would permit a description of the parthenogenetic morphs of that species.

We therefore decided to take other samples from the same place and surrounding area but without success. We also requested preparations of *A.ericetorum* from the collection of the British Museum (Natural History) in order to check the presence or absence of the cephalic spinal papillae and to establish whether we were dealing with a single species or two different species. The British Museum (Natural History) kindly sent us two preparations totalling 2 oviparae and 2 males (cotypes) and two parthenogenetic apterae, all of which were determined by D. Hille Ris Lambers. Studying them has enabled us to describe both the parthenogenetic apterae of *A.ericetorum* H.R.L. and a new species: *A.echinospartii* sp. nov., using the Spanish material.

2. ACYRTHOSIPHON (A.) ERICETORUM H.R.L., 1959

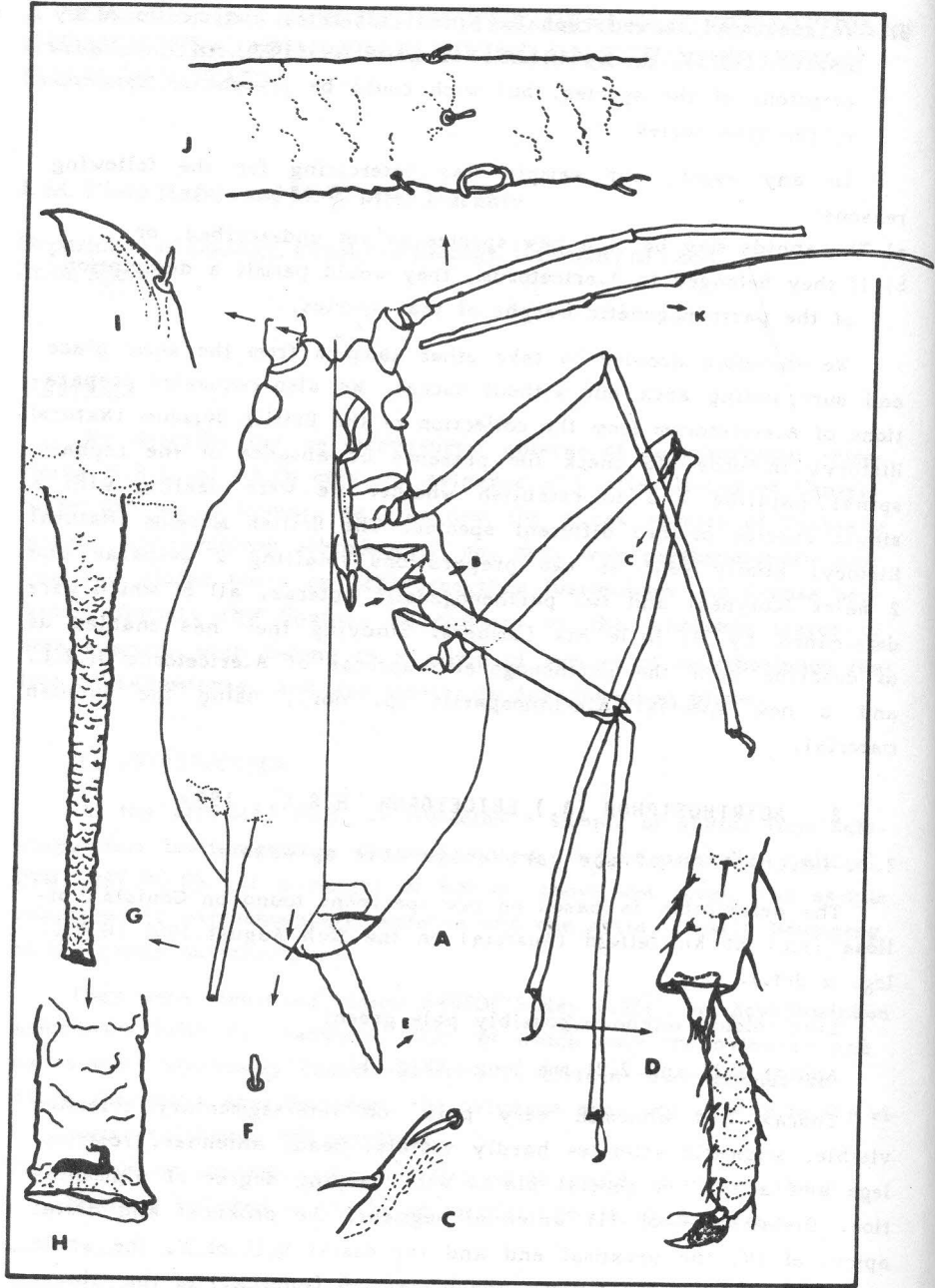
2.1. Description of the parthenogenetic apterae

The description is based on two specimens found on *Genista ± pillosa* (sic) at Knittelfeld (Austria) on the 26th August 1960 (H.R.L. leg. & det.).

Live colour: unknown, possibly pale green.

Aphids 2.27 and 2.21 mm long. (Fig. 1).

Thorax and abdomen very pale, no intersegmentary sclerites visible, stigmatic sclerites hardly visible. Head, antennae, rostrum, legs and anal plus genital plates with varying degree of pigmentation. Distal apex of III antennal segment, the proximal and distal apices of IV, the proximal end and the distal half of V, the whole of VI, the ends of the femora, the distal 1/9 (approx.) of the tibiae, the whole tarsi and the tips of the siphunculi (pigmented progressi-



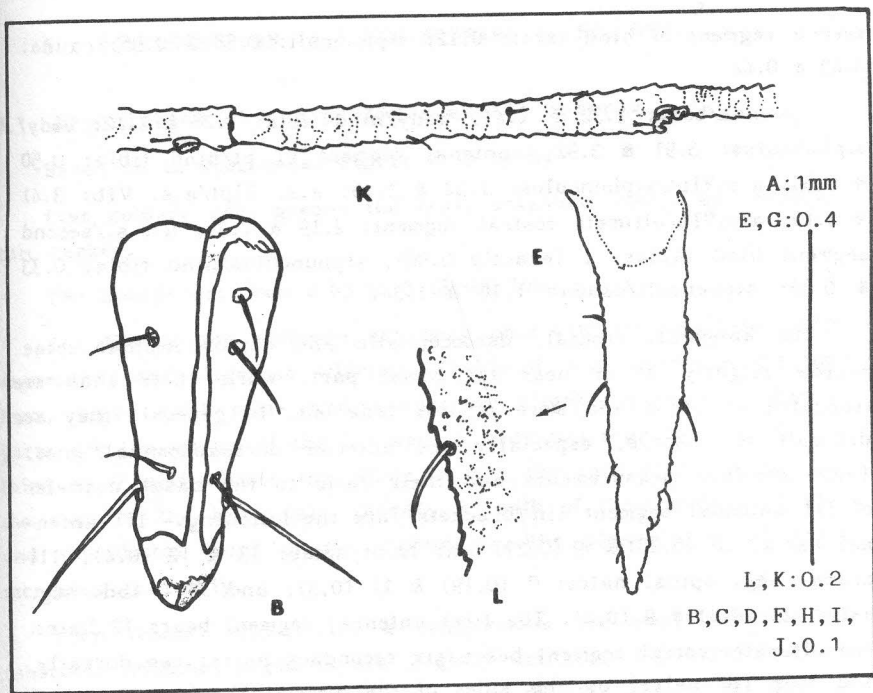


Fig. 1 (also on opposite page).- *Acyrthosiphon ericetorum* H.R.L., parthenogentic aptera.

vely from the totally pale basal part) are dark coloured or even black (the tarsi for example).

The frontal sinus is deep, with the frontomedial tubercle slightly insinuated. The antennal segments are wrinkled, like the back of the head, with no papillae. III segment has 1 or 2 secondary rhinaria near the basal part. Rostrum reaching the hind coxae. The ultimate rostral segment is robust, elongated, with slightly concave edges. The siphunculi are rough imbricate in appearance, with no transverse apical incision but with a small widened apical ring. They are narrow, their width in the middle being similar to that of the hind tibiae, approximately $1/2$ the width of the cauda at the second pair of setae.

Antennae: 3.106 & 3.105 mm; antennal segments III: 0.67 & 0.65, IV: 0.54 & 0.51, V: 0.55 & 0.53, VI b: 0.26 & 0.27, VI pt: 0.88 & 0.83; hind tibiae: 1.778 & 1.553; ultimate rostral segment: 0.12;

second segment of hind tarsi: 0.12; siphunculi: 0.58 & 0.56; cauda: 0.49 & 0.42.

Antenna/body: 1.32 & 1.41; body/hind tibia: 1.28 & 1.42; body/siphunculus: 3.91 & 3.92; antennal segment VI pt/hind tibia: 0.50 & 0.53; a.s.VIpt/siphunculus: 1.52 & 1.48; a.s. VIpt/a.s. VIb: 3.41 & 3.10; a.s.VIb/ultimate rostral segment: 2.19 & 2.31; u.r.s./second segment hind tarsus: 1 (exactly 0.96); siphunculus/hind tibia: 0.33 & 0.36; siphunculi/cauda: 1.18 & 1.34.

The antennal, frontal, dorsocephalic and dorsoabdominal setae narrow slightly at or near the basal part, while their ends are truncated or blunt and more or less fade out. In general, they are difficult to observe, especially the anterior dorsoabdominal ones. Their absolute measurements and their ratio to the basal diameter of III antennal segment (in brackets) are the following.- III antennal hairs: 10 (0.28) & 9 (0.27) μm ; front setae: 13 & 12 (0.4); III abdom. seg. spinal hairs: 7 (0.19) & 11 (0,3); and VIII abd. seg. hairs: 11 (0,3) & 9 (0,4). The first antennal segment bears 12 hairs. The ultimate rostral segment bears six secondary hairs: two dorsally and four (in pairs) on the sides of the groove; the lateral apical pair being exceptionally long. One specimen had 7 setae on the VIII abdominal segment. There are less than 15 hairs on the posterior edge of the genital plate and no central ones. The cauda bears 8 or 9; those of the 2 or 3 basal pairs are long, fine and tapering, while the rest, towards the apex, are shorter and their ends blunt. The leg hairs are short, the length of all of them being less than the diameter of the trochantero-femoral joint. Those on the femora are noticeably similar in shape to the dorsal body hairs and those on the trochanters, tibiae and tarsi, more or less pointed. Tarsal formula: 3.3.3.

2.2. Designation of lectotype of *A.ericetorum* H.R.L., 1959

Article 74 of the International Code of Zoological Nomenclature establishes that 'if an animal species has no holotype, any zoologist may purpose one of the syntypes as a lectotype'.

We designate as a lectotype of *Acyrtosiphon ericetorum* H.R.L. the ovipara n°1 in the table of measurements in HILLE RIS LAMBERS, 1959: page 272; this specimen is mounted top left slide BM V 84-340.

3. ACYRTHOSIPHON (A.) ECHINOSPARTII SP. NOV.

3.1. Description of the parthenogenetic apterae

Based on 14 specimens. Figure 2: A to N.

Live colour: pale green; the legs, antennae, cauda and siphunculi darker.

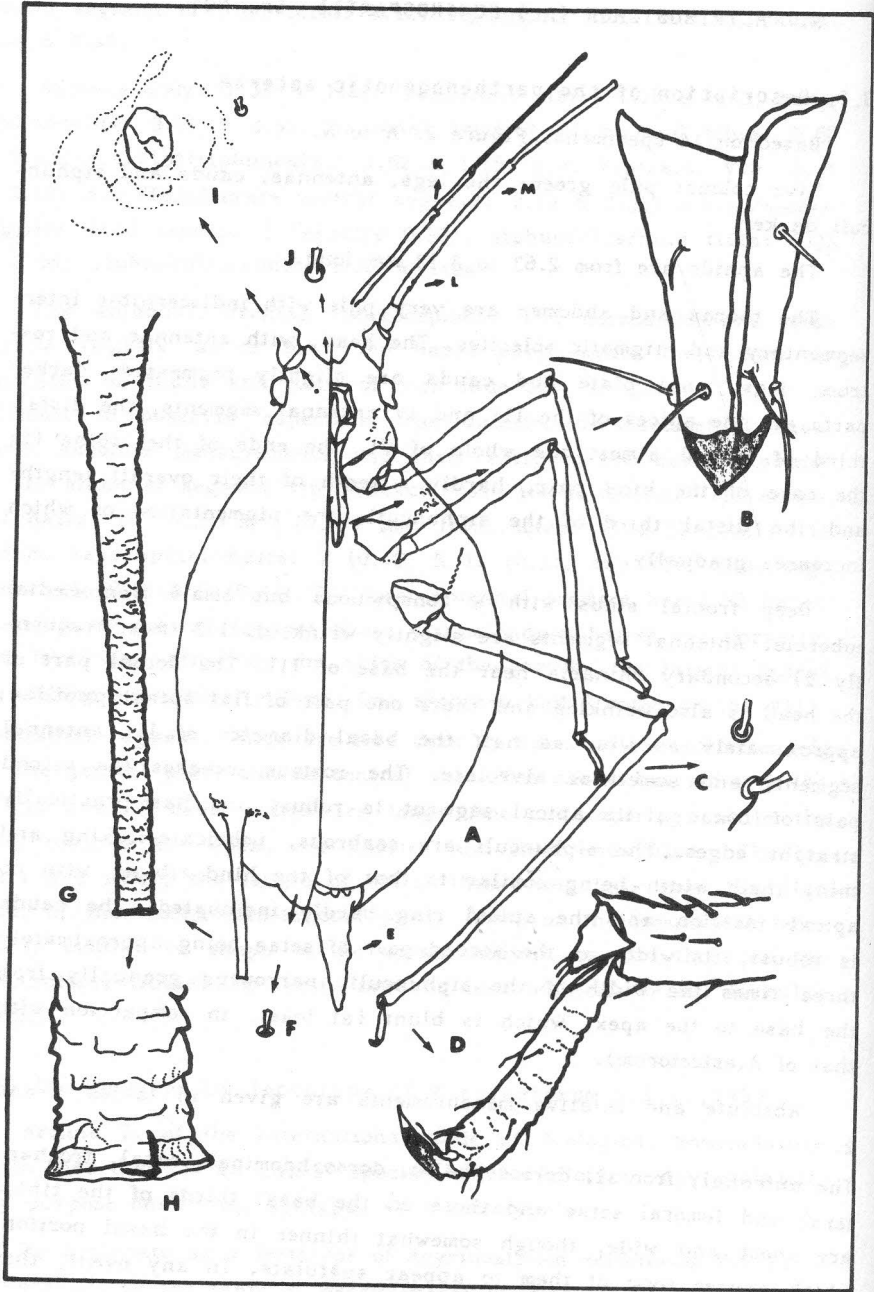
The aphids are from 2.63 to 3.13 mm long..

The thorax and abdomen are very pale with indiscernible intersegmentary and stigmatic sclerites. The head, with antennae and rostrum, legs, anal plate and cauda are slightly pigmented; darker parts are the apices of the III and IV antennal segments, the distal third of V and almost the whole of VI, the ends of the tibiae (in the case of the hind pair, hardly a tenth of their overall length) and the distal third of the siphunculi, the pigmentation of which increases gradually.

Deep frontal sinus, with a conspicuous but small frontomedial tubercle. Antennal segments are slightly wrinkled; 1-3 (most frequently 2) secondary rhinaria near the base of III. The dorsal part of the head is also wrinkled and bears one pair of flat spinal papillae, approximately as wide as half the basal diameter of III antennal segment, and sometimes alveolate. The rostrum reaches the second pair of coxae ; its apical segment is robust and has practically straight edges. The siphunculi are scabrous, imbricate-looking and thin, their width being similar to that of the hind tibiae, with no apical incision and the apical ring hardly insinuated. The cauda is robust, its width at the second pair of setae being approximately three times the width of the siphunculi, narrowing gradually from the base to the apex, which is blunt (at least, in comparison with that of *A.ericetorum*).

Absolute and relative measurements are given in tables 1 and 2.

The antennal, frontal, dorsocephalic, dorsoabdominal, coxal, trochanteral and femoral setae and those on the basal thirds of the tibiae are short and wide, though somewhat thinner in the basal portion, which causes some of them to appear spatulate. In any event, they are blunt or truncated with more or less fade out apices. Their me-



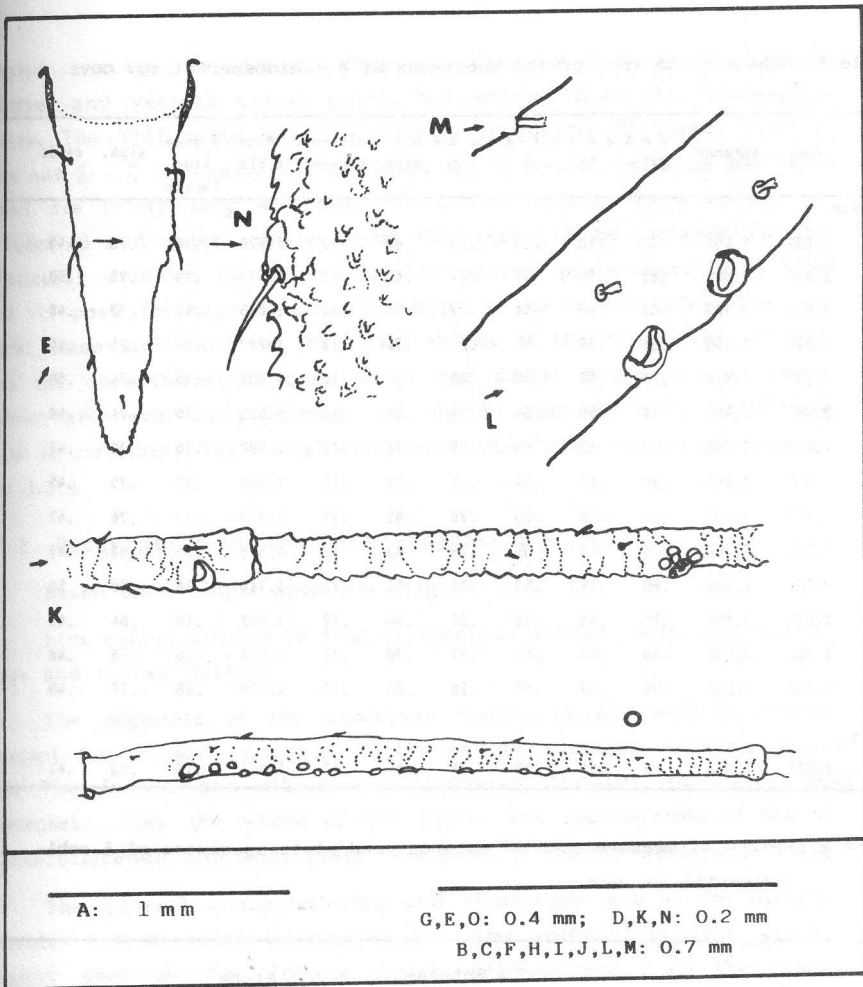


Fig. 2 (also on the opposite page). *Acyrthosiphon echinospartii* sp. nov.
A to N: aptera; O: alate.

Measurements and their ratio to the basal diameter of III antennal segment (in brackets) are as follows:

frontal: 7 - 11 μm (0.15 - 0.28); III antennal segm.: 7 - 8 μm (0.15 - 0.21); III abdominal segment spinal: 4 - 7 μm (0.11 - 0.16); VIII abdominal segment: 9 - 11 μm (0.20 - 0.28).

The first antennal segment bears 5 - 8 hairs. The ultimate rostral segment has 6 or 8 accessory ones, there normally being two ventral

Table 1. Measurements (mm) of the specimens of *A.echinospartii* sp. nov.

| №. | Body | Antenna | antennal segment | | | | | ult.ros. segment | Hind tibia | 2 segm. hind tarsus | siph. | cauda |
|----------------|-------|---------|------------------|-----|-----|-----|------|------------------|------------|---------------------|-------|-------|
| | | | III | IV | V | VIb | VIpt | | | | | |
| Apterae | | | | | | | | | | | | |
| 1 | 2.632 | 2.902 | .72 | .50 | .50 | .25 | .68 | .12 | 1.620 | .16 | .70 | .45 |
| 2 | 2.812 | 2.880 | .81 | .52 | .54 | .24 | .62 | .11 | 1.733 | .16 | .72 | .50 |
| 3 | 2.947 | 2.700 | .68 | .47 | .51 | .24 | .64 | .12 | 1.665 | .16 | .73 | .48 |
| 4 | 2.925 | 3.150 | .81 | .59 | .57 | .27 | .71 | .12 | 1.777 | .16 | .75 | .46 |
| 5 | 3.037 | 2.970 | .80 | .52 | .59 | .65 | .61 | .12 | 1.800 | .17 | .74 | .50 |
| 6 | 3.082 | 2.902 | .78 | .50 | .54 | .24 | .61 | .12 | 1.530 | .16 | .74 | .48 |
| 7 | 2.847 | 3.285 | .83 | .63 | .59 | .28 | .71 | .12 | 1.890 | .18 | .78 | .47 |
| 8 | 2.902 | 3.195 | .86 | .57 | .57 | .25 | .71 | .12 | 1.800 | .17 | .75 | .45 |
| 9 | 3.127 | 1.060 | .83 | .48 | .54 | .26 | .62 | .12 | 1.777 | .17 | .76 | .47 |
| 10 | 2.677 | 2.790 | .74 | .49 | .50 | .24 | .63 | .12 | 1.575 | .16 | .66 | .47 |
| 11 | 3.060 | 2.925 | .80 | .54 | .53 | .26 | .61 | .12 | 1.710 | .16 | .76 | .50 |
| 12 | 2.835 | 2.655 | .71 | .45 | .48 | .23 | .58 | .12 | 1.552 | .16 | .64 | .45 |
| 13 | 2.722 | 3.080 | .80 | .54 | .57 | .27 | .70 | .12 | 1.800 | .16 | .76 | .48 |
| 14 | 2.722 | 2.947 | .79 | .49 | .55 | .28 | .66 | .12 | 1.710 | .16 | .72 | .48 |
| Alate | | | | | | | | | | | | |
| 1 | 2.677 | 3.060 | .79 | .56 | .59 | .34 | .64 | .12 | 1.822 | .16 | .63 | .41 |

Table 2. Ratios of measurements of apterous and alate specimens of *A.echinospartii* sp. nov.

| | Apterae | Alate |
|---------------------------------|-------------|-------|
| Antenna / body | 0.92 - 1.15 | 1.14 |
| Body / hind tibia | 1.51 - 2.01 | 1.46 |
| Body / siphunculus | 3.58 - 4.40 | 4.28 |
| siphunculus / hind tibia | 0.41 - 0.48 | 0.34 |
| siphunculus / cauda | 1.44 - 1.67 | 1.52 |
| ant.segm. VIpt / siphunculi | 0.81 - 0.97 | 1.02 |
| ant.segm. VIpt / hind tibia | 0.34 - 0.42 | 0.35 |
| ant.segm. VIpt / VI b | 2.34 - 2.72 | 1.89 |
| ant.segm. VI b / ult.ros.seg. | 1.93 - 2.30 | 2.93 |
| ult.ros.segm. / 2 seg.hind tar. | 0.67 - 0.75 | 0.75 |

pairs, and the rest dorsal. They are almost as long as those of the dorsal and ventral apical pairs, but shorter than the lateroapical ones. The VIII urite has 7 - 9 (most frequently 8) setae. The cauda has 5 - 8 (normally 7), of which the 2 lateral pairs on the basal half are fairly long and pointed. The remainder -more distal- are truncated and paler, and so short that they can be mistaken for the cuticular wrinkles of the cauda. The genital plate bears 12-18 setae on its posterior edge, similar in shape to the dorsal hairs. The femoral setae and those on the basal thirds of the tibiae are as short as the dorsoabdominal ones while the distal hairs on the tibiae, which are never fully pointed, are shorter than the width of the middle of the tibia. The tarsal setae are also short; the tarsal formula is 3.3.3.

3.2. Description of the parthenogenetic alatae

Based on a single specimen. Fig. 2, 0.

Live colour similar to that of apterous aphids, with legs, antennae and thorax darker.

The segments of the processus terminalis are well pigmented, except for a small area near III, as are antennal segments I and II. The femora and tibiae are pigmented distally, the latter more intensely, like the whole of the tarsi. The pigmentation of the siphunculi, cauda and anal plate is similar to that of apterous insects.

The general characteristics and chaetotaxy are as for apterae (tables 1 & 2) with 8 setae on the first antennal segment, 4+2 accessory ones on the ultimate rostral segment and 7 on the cauda. The specimen has 13 secondary sensoria on the both antennae.

3.3. Name derivation and types

The specific name is taken from the genus *Echinospartium* (Leguminosae, widely distributed in the Iberian Peninsula and Morocco and on at least one species of which this aphids lives.

The holotype is the parthenogenetic aptera number 4, found on *Echinospartium lusitanicum* at Ginzo de Limia (Orense province, Galicia, Spain) on the 17th May 1978. The paratypes are the other 14 parthenogenetic females (13 apterae and one alata) found at the same place and on the same date. The holotype and some of the

paratypes are kept in the Nieto-Mier collection in the Department of Zoology of the University of León, while other paratypes are at the 'Institut Pasteur' -in the G. Remaudière collection- Paris, and the British Museum (Natural History) London.

4. THE TAXONOMIC STATUS OF *A.(A.) ERICETORUM* H.R.L. AND *A.(A.) ECHINOSPARTII* SP. NOV.

HILLE RIS LAMBERS (1959) gives *A.ericetorum* as belonging to the group of species of the genus that live on species of Leguminosae and are similar to *A.pisum*, but separate from the *A.loti* - *A.caraganae* group. We consider this to be right and to be borne out by the following.

EASTOP (1971) included almost all the then known species of *Acyrtosiphon* in his excellent keys and commented on the rest to facilitate their identification. According to our information, the following species have since been described: *A.assiniboinensis* Robinson, 1973 (not included in EASTOP & HILLE RIS LAMBERS, 1976); *A.auriculariae* Martin, 1982; *A.churchillae* Robinson, 1979; *A.crepidis* Holman et Szelgiewicz, 1975; *A.cyatheae* Holman, 1974; *A.pedicularis* Richards, 1972; *A.pentatrichopus* Hille Ris Lambers, 1974; *A.phaseoli* Chakrabarti, A.K.Ghosh et RayChaudhuri, 1971 (the only one to live on leguminous plants, though herbaceous ones) and *A.vandenboschi* Hille Ris Lambers, 1974. In the description of many of them express mention is made of EASTOP'S key, or the new species is compared with others already included in it, in order to arrive at their taxonomic status.

In the case in point, this is even more necessary and they should even be included in the updated key, as:

- 1) with the parthenogenetic apterae of *A.ericetorum*, we arrive (with reservation) at *A.pisum* s.lat.;
- 2) with those of *A.echinospartii*, we arrive, as already stated, with certain problems, at *A.ericetorum* (oviparae).

EASTOP'S key to the parthenogenetic apterae of *Acyrtosiphon* is easily modified to include these species as follows:

- 30 (29) First antennal segment bearing 9 - 23, usually 12 or more, hairs.
Ultimate rostral segment 3/5 - 19/20 as long as the second segment of the hind tarsus. Body 2 3/4 - 4 1/2 times as long as the

siphunculi, which are $1 \frac{1}{5}$ - $1 \frac{4}{5}$ as long as the cauda, which bears 8 - 23 hairs. Processus terminalis 3 - 5 times as long as the base of the sixth antennal segment, which is $1 \frac{1}{2}$ - $2 \frac{1}{2}$ times as long as the ultimate rostral segment. On Leguminosae.

30 A Cauda bearing 8 - 23 hairs long and pointed. Siphunculi smooth or slightly imbricate, their diameter at the middle less than $\frac{1}{2}$ of the caudal width at the second pair of hairs. On Leguminosae. . . . A. (A.) pisum s.lat. 31

-- Cauda bearing 8 - 9 (9-13 on oviparae) hairs, of which the distal 3 - 4 have blunt apices; the other (paired) are long and pointed. Siphunculi imbricate and at most $\frac{1}{2}$ as thick as the caudal width at the second pair of hairs. On Genista anglica and G. pilosa. A. (A.) ericetorum.

-- First antennal segment bearing 5 - 13, but rarely more than 11, hairs (if there are 8 - 12 hairs vide 30 A) 32

32 (30), 33 (32), 34 (33), 35 (34), 37 (35), 44 (37,40): as in Eastop key.

45 (44) Processus terminalis $2 \frac{1}{3}$ - $2 \frac{4}{5}$ as long as the base of the sixth antennal segment (232 - 277 μ m long). Processus terminalis $\frac{4}{5}$ - 1 as long as the siphunculi. Ultimate rostral segment about $\frac{3}{4}$ (0.67 - 0.77) the length of the second segment of the hind tarsus and bearing 6 - 7 accessory hairs. Cauda bearing 5 - 8 hairs, of which the distal 3 or 4 have blunt apices.

Body $3 \frac{1}{2}$ - $4 \frac{1}{2}$ times as long as the siphunculi, which are as thick as the diameter of the posterior tibia at the middle and $\frac{1}{2}$ as thick as the diameter of the cauda at the second pair of hairs, and $1 \frac{4}{10}$ - $1 \frac{7}{10}$ times as long as the cauda. Body hairs short, those on the anterior abdominal tergites 4-7 μ m long and those on the eighth abdominal segment 9-11 μ m long. On Echinospartium. Spain. A. (A.) echinospartii sp. nov.

-- Processus terminalis usually more than 3 times as long as the base of the sixth antennal segment (thenceforth as in Eastop's key: 45 (44) --, pag. 15) 46

As we have seen, A.ericetorum and A.echinospartii, despite their similarity, may be distinguished from each other using a series of metric and chaetotaxic features, as may the other species mentioned

in the key, though the differences between *A.ericetorum* and *A.pisum* are concerned more with "facies" than with measurable features.

Furthermore, of the species not mentioned in the key, in Western Europe there is on papilionaceous shrubs *A. genistae* Mordvilko, 1914, which lives on *Genista* and has narrow and very dark siphunculi and a low number of hairs on the first antennal segment (under 13) (EASTOP, 1971) and a processus terminalis which is hardly 3 1/2 times as long as the base of the VI antennal segment (SHAPOSHNIKOV, 1964).

ACKNOWLEDGMENTS

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