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Aphis (Absinthaphis) georgii n. sp. (Homoptera Aphididae), a new aphid living on Artemisia (Compositae) in Spain.

by M.P. Mier Durante, J.M. Nieto Nafría

Abstract: Eight species are included in the subgenus *Absinthaphis: Aphis (Ab.)cinae* (Nevsky, 1928), *A.(Ab.) hirsuta* (Nevsky, 1929), *A. (Ab.) hortobagyi* Szelegiewicz, 1978, *A.(Ab) judenkoi* (Szelegiewicz, 1959), *A.(Ab.) koraiensis* (Paik, 1972), *A. (Ab.) pannonica* Szelegiewicz, 1978, *A. (Ab.) safavii* Remaudière n.n. pro *A. (Ab.) alba* (Remaudière et Davatchi, 1959), *A.(Ab.) tashevella* Eastop et Hille Ris Lambers, 1976, and another new species recorded in Spain: *Aphis (Absinthaphis) georgii* n. sp., which is described here. Taxonomic position and nomenclatorial problems of the subgenus and several species are discussed. Some of the diagnostic characteristics of the subgenus could be considered biotypical and they are similar to those of other gena living on species of the same Compositae group. However, others are fully or in part absent on other species of subgenus *Aphis* living on the same plants.

Key words: Homoptera Aphididae – Aphis, Absinthaphis – new species – Spain – Taxonomy.

Introduction

The genera of Compositae of Artemisieae and of Gnaphalieae allow for the development of several aphid species of different genera, for instance and only in the Palaearctic fauna: *Protrama, Aphis, Cryptosiphon, Coloradoa, Pleotrichophorus, Macrosiphoniella* and *Titanosiphon.* There are different genera, such as *Misturaphis* from North America, outside the Palaearctic fauna. Other genera, *Brachycaudus, Myzus,* also include species which are not strictly associated to these Compositae.

Of all these, *Protrama* is the only one which does not belong to the subfamily Aphidinae, *sensu stricto* (Aphididae of other classifications).

On the other hand, *Aphis* and *Cryptosiphon* are Aphidini and the remainder are Macrosiphini.

In the genus *Aphis*, there are three subgenera with species strictly related to *Artemisia*, *Helichrysum* and to close genera: *Aphis*, *Protaphis* and *Absinthaphis*.

The subgenus *Protaphis* is wholely associated to the Compositae, although not preponderantly to Artemisieae and Gnaphalieae, and in it the ultimate rostral segment is stiletto-shaped, though its sides are not especially concave. On the other hand, the round form of the cauda and the shortness of the antennal joints and, in particular of the processus terminalis are usually related to its way of life: radicolous. This subgenus is considered a genus by EASTOP (1979).

The nominotypical subgenus *Aphis* also includes some species which live on *Artemisia*, the recently described ones (HOLMAN, 1987) such as *Aphis artemisipholia* and *A. artemisiphaga*. In both species the tendency the rostrum has to have concave sides, though not very pronounced, is observed. However, in both species, the cauda is shorter and triangular. HOLMAN (1987) considers this characteristic, as well as the presence of many hairs to be due to «adaptation to the life on basal portions of plants».

Lastly, the known species of the subgenus *Absinthaphis*, genus for EASTOP (1979), until now, are strictly associated to *Artemisia* (7 in all) and to *Helichrysum* (only one). Their overall appearance is very similar. The more noteworthy features are: the shape of the ultimate rostral segment which is similar to the previously mentioned shape for the aphids related to *Artemisia*, the shape of the cauda which is triangular or rounded, shortness of the antennae, of the joints and processus terminalis, and the shape of their siphunculi which are very characteristic (Fig. 1); volcano-like as expressed by EASTOP (1979).

Results

Taxonomic and nomenclatorial observations on the Subgenus Absinthaphis and their species

The genus *Absinthaphis* was established by PAIK (1972), with *Absinthaphis koraiensis* Paik, 1972 as a type species. We have examined the availability of both names, taking into account the norms laid down by the International Code of Zoological Nomenclature in 1985 and we feel both as being available.

The species is so because there exist short references to some illustration in the text, which when compiled together can be regarded as a definition in accordance with the I. C. Z. N. –eventhough the types have not been established, nor have there been any more details, nor has it been written as a new species.

The name of the genus is so because, as it is included in a key, the propositions of the key constitute a definition in accordance with I. C. Z. N. and because it has been named being obligatory, (art. 13b of the I. C. Z. N.) type species by indication.

Absinthaphis Remaudière in Starý et Remaudière, 1973 (type spe-

cies: *Cryptosiphum cinae* Nevsky) established as subgenus of *Protaphis* Börner 1952, is junior synonym as well as being homonyme of *Absinthaphis* Paik, 1972.

The characteristics of these species are summarized in Table 1. We can see that it is possible to separate them without any great difficulty, as the specimens of the subgenus we caught in Spain can also be separated which we describe later.

The constancy of the previously mentioned characteristics can also be observed in Table 1, we consider that the form of the ultimate rostral segment is related to the host plant while the size and shape of the cauda, the size of the siphunculi and the size of the antennae is related to their way of life (in very compact groups, at times on the lower part of the plant and at times in the small spaces between the leaves). However, the shape of the siphunculi does not seem to be related to the plant or to their habitat.

A. (Ab.) alba (Remaudière et Davatchi, 1959) is also a well known species, but it is a junior secondary homonym of Aphis alba Ratzebur, 1844 –synonym of Kaltenbachiella pallida (Haliday, 1838)– and of Aphis alba Miller, 1937 and it is necessary to give a replacement name to it (Remaudière pers. com.). This name is Aphis (Absinthaphis) safavii Remaudière in Mier et Nieto n.n. pro A. (Ab.) alba (Remaudière et Davatchi, 1959).

A replacement name for *Aphis alba* Miller, 1937 should be proposed, but this species is unknown –it was not well described, recorded only once and types do not exist– and for this reason it would be unwise to give it another name.

A. (Ab.) hortobagyi Szelegiewicz, 1978, A. (Ab.) judenkoi (Szelegiewicz, 1959), A. (Ab.) pannonica Szelegiewicz, 1978 and A. (Ab.) tashevella Eastop et Hille Ris Lambers, 1976 are well known species also because of their original descriptions (in the case of the last one by TASHEV (1964) with the name Brachyunguis lambersi).

However, the descriptions (NEVSKY, 1929) of *A. (Ab.) cinae* and *A. (Ab) hirsuta* are also good, although, because they are earlier descriptions, they do not give certain data, which normally appear in modern descriptions. In either case, having been able to use the material *A. (Ab.) cinae* kindly provided by the British Museum (Natural History), we can furnish drawings of apterous and alate (figs 5, 6, 10, 12, 14, 18, 20) completing the illustrations which are lacking in the original description, which is of particular interest as it is the *Absinthaphis* Remaudière type species, as we have already stated.

	A.(Ab.) cinae	A.(Ab.)hirsuta	A.(Ab.)hortobagyi	A.(Ab,.)judenkoi	A.(Ab.)pannonica	A. (Ab.)safavii n.n.	A.(Ab)tashevella	A.(Ab.)georgii n.sp.*
1: Countries	USSR: Uzbekistan Kazajstan Turkmenistan	USSR: Uzbekistan	HUNGARY	POLAND	HUNGARY	IRAN	BULGARY	SPAIN
2: Plant host	<u>Artemisia cina</u> <u>A</u> . <u>annua</u>	<u>Artemisia</u> sp.	<u>A. maritima</u> spp. <u>monogyna</u>	<u>A</u> . <u>campestris</u>	<u>A</u> . <u>absinthium</u>	<u>Helichrysum</u> armoenum	<u>Artemisia</u> sp.	<u>A</u> . <u>campestris</u> ssp. <u>glutinosa</u>
3: Body length	1-1.50	1-1.4	1.04-1.16	1.37-1.70	1.37-1.48	1.4-1.97	1.29-1.69	1.05-1.70
4: Colour in life	with waxy yellow greenish	with waxy dark green or dark brown	without waxy brownish	pale green	without waxy brown	with waxy pale yellow	with waxy brown (SZELEG. says green)	with waxy dark green to grey
5: Pigmentation	ant. (I, II,VI) femurs, tarsi, siphunculi	ant. (art.), siphunculi legs	head, ant.(end) siphunculi	head, ant.(I,II) siphunc., femurs	ant. (I,II,V apex, VI) legs (tibia pale) siphunc., head	head, ant , legs siphunculi	head, siphunculi	similar to <u>A</u> (<u>Ab</u> .) <u>pannonica</u>
6: Sclerites	intersegmental*		intersegmental	intersegmental	intersegmental irregular (V) VI bars across VII-VIII	intersegmental		inters. on VI bar on VII arch on VIII
7: Marginal tubercles	i VII feeble	I VII feeble	l: 0 28-36 um VII: 0 30-40 um II-VI: 0 12-20 um	i (II-III) (VI) VII 0 94 <i>u</i> m	l: 0 36-50 um VII: 0 32-60 um II-VI: 0 20-32 um	I VII small	i VII small 0 35 um	I VII
8: Num. of ant. joints	6	5-6	5-6	6	6	6	6	5-6
9: Antenna / body	0.5	0.35	0.42-0.48	0.5	0.32-0.47	0.35-0.45	0.4-0.5	0.38-0.55
10: Ant. IV /ant. III	1	0.6	0.66	0.5	0.66	0.49-0.58	0.5-0.8	0.65-0.86
11: Ant IV / ant. V	1	1		0.757-0.961		0.886-1.111		0.75-1.05
12: Ant. III / ant. VI	1	0.66		0.751-0.925		0.87-1.08		0.59-0.90
13: VI pt. / VI b	1	0.5	0.46-0.56	0.75	0.7-0.84	0.76-0.89	0.66	0.47-0.72
14: III Secondary rhinaria IV V	3 2 1		1-2 1 0	2-4 1-2 0	0 0 usually 0	0-8 1-5 0-1	0-5 0-3 0-2	0-6 0-4 0-1
15: Ultimate rostral segment (r)			Stiletto-shaped 0.1 mm. 2-2.80 r		Stiletto-shaped 0.12-0.14 mm 2.8 - 3.3 0 r	Long and pointed 0.186-0.199 mm 40 r	0.129-0.139 mm. 2.6 - 2.8 0 r	Stiletto-shaped 0.104-0.132 mm 2.40-2.73 0 r

	A.(Ab.) cinae	A.(Ab.)hirsuta	A.(Ab.)hortobagyi	A.(Ab,.)judenkoi	A.(Ab.)pannonica	A. (Ab.)safavii n.n.	A.(Ab)tashevella	A.(Ab.)georgii n.sp.*
16: r/III ant.	0.75		1	0.755-0777	1	1		0.64-1.14
17: r / second hind tarsus	1.08	1.08	1.1-1.2		1.3-1.4	1.7-1.8	1.06-1.77	1.04-1.20
18: Siphunculus/2nd hınd tarsus	ал.		0.5	1	0.75	0.5	1	0.48-0.65 (0.77)
19: Siphunculus / body	0.03-0.04		0.025-0.038	0.048-0.076	0.029-0.045		×	0.033-0.053
20: Cauda / siphunculus			2-3.3	1.2-1.5	1.5-2	2		1.18-1.89
21: Cauda / basal width		e	0.66-0.83		0.59-0.70	4		0.55-0.63
22: Dorsocephalic hairs	0.2-0.36 d. int.*		16-21 um			0.25-0.33 d. interant 40-50 <i>u</i> m		0.067-0.076 d. interant. 11-12 um
23: III ant. hairs		pointed 1 0 III ant.	blunt 0.3-0.45 0 III ant. , 6-9 um	0.5 0 III ant.	blunt 0.35-0.5 0 III 6-10 <i>u</i> m	pointed 1 0 III ant. 23-30 <i>u</i> m	0.44-0.66 0 III	pointed 0.25-0.40 0 III 4 - 6 <i>u</i> m
24: Rost. accesory hairs	2		2	. 2	2	2	2-4	2 (3)
25: First tarsal chaet.	3. 3 .2 *		3.3.2	3.3.2	3.3.2	3.3.3 3.3.2	3.3.2	3.3.2
26: III - IV abdominal hairs	short and pointed 16 um (o)	long and spatulated 50 <i>u</i> m	blunt 0.7-0.9 0 III ant. 14-17 <i>u</i> m	pointed 2 0 III ant.	blunt 0.5-0.7 0 III ant. 12-15 <i>u</i> m	pointed 0 III ant.	acute 26-29 <i>u</i> m	deliquescent 0.61-0.78 0 III ant. 11 um
27: VIII abdominal hairs			5-6 18-26 <i>u</i> m	6-8	4-8 14-20 um	8-11 55 um	6 35-42 <i>u</i> m	4-6 (9) 11-13 (16) um
28: Hairs of cauda	17-25* 10 (al) 8 (o)	a.	23-29	12	19-21	21-27	until 26	16-26 (33)
29: Hairs of genital plate			2 4-6		1-2 3-4	2-4 ant. 9-13 post.		2 4-6

Table 1: Bibliographic and new (*) data on Aphis (Absinthaphis) species, except A. (Ab.) koraiensis (Paik).

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Figs 1-4: *Aphis (Absinthaphis) georgii* n. sp., apterous viviparous female. 1, general view. 2, dorsal cephalic setae. 3, setae of the II abdominal tergite. 4, setae of the VIII abdominal tergite.

Finally, the description of *A*. (*Ab.*) *koraiensis* does not exist. There is only one definition with only a very few illustrations as we have already pointed out.

The distribution of the subgenus species, in accordance with the exact bibliographic data, is shown on Table 1 and Korea for A. (Ab.) korai-

ensis. It must also be taken into account that *A. (Ab.) cinae* is also found in Iran: Ahvaz, 17-IV-78, on *Artemisia dracunculus*, B. M. (N. H.) col. and Sud de Kerman, 2.800 m., 26-VI-1955 on *Artemisia cina* G. Remaudière col., and Afghanistan: Baghlan, 3-VI-1956 on *Artemisia* sp. G. Remaudière col.. Lastly STARÝ & REMAUDIÈRE (1973) state that the subgenus is also found in North Africa, Turkey, Iran and Afghanistan.

Aphis (Absinthaphis) georgii n. sp.

Apterous viviparous female (119 specimens) (Figs. 1-4, 7,11,13,15,16,19,21; Table 1)

Live specimens of a greyish colour caused by the waxy excretion which covers them. In alcohol they are a dark greenish colour.

Body broadly oval: 1,05 - 1,70 mm long.

Head, rostrum, antennal joints I, II, V and VI, coxa, trochanter, femur, apex tibia, tarsus, abdominal sclerites, siphunculi and cauda are well pigmented.

Frons slightly convex in the centre and antennal tubercles absent. Eyes with distinct triommatidion. Dorsal cephalic hairs sparse and acute, about $11 - 12 \mu \log$ and 0,60 - 0,80 times as long as basal diameter of antennal joint III. The proportion between the interantennal length and the frontal hair length is between 13.09 and 14.80 being very much superior to that of *A*. (*Ab.*) cinae.

Antennae 0.42 - 0.81 mm are much shorter than the body length 0.38 - 0.55 times, generally with 6 joints with a certain tendency towards a total or partial fusion of joints III and IV; in small-sized apterous the tendency to fusion is more frequent: joint III is variable in length 95 - 182 (204) µm and is 0.59 - 0.90 times as long as joint VI. The antennal joint IV length is 68 - 118 (141) µm and that of joint V is 68 -143 µm.

The processus terminalis length of joint VI is also very variable, measuring 0.045 - 0.095 mm and 0.47 - 0.72 times as long as base of antennal VI, 0.091 - 0.132 mm.

Antennae usually have secondary rhinaria distributed in the following way: 0 - 6 in III; 0 - 4 in IV; 0 - 1 in V. Antennal hairs very sparse, those on the antennal joints III are very short, $4 - 6 \mu m \log$, and 0.25 - 0.40 times as long as basal diameter of antennal joint III.

Rostrum reaching or slightly going beyond the hind coxae level; ultimate rostral segment is elongated with a slight tendendy to concavity on the sides. It is 0.104 - 0.132 mm long and it is 2.40 - 2.73 times as long as its basal width and it is 1.04 - 1.20 times as long as hind tarsal



Figs 5-17: 5, 10, 12, 14, *Aphis (Absinthaphis) cinae* (Nevsky), apterous viviparous female. 6, *A. (Ab.) cinae*, alate viviparous female, 7, 11, 13, 15, 16 *A. (Ab.) georgii* n. sp., apterous viviparous female. 8, *A. (Ab.) georgii*, alate viviparous female. 9, 17, *A. (Ab.) georgii*, male. 5-9: antennal flagellum. 10, 11:head. 12, 13: ultimate rostral segment. 14, 15: cuda. 16: siphunculus. 17: male genitalia. Without pigmentation.

segment II. It has 2, exceptionally 3, long complementary hairs. Marginal tubercles on segments I and VII only.

Rather short legs. Femur of the third pair of legs 0.23 - 0.37 mm long and 0.16 - 0.23 times as long as body length. Tibia of the same leg is 0.41 - 0.71 mm long and 0.31 - 0.47 times as long as body length.

Femur hairs are very short, the longer ones not reaching 1/3 the diameter of the trochantero-femoral suture.

Ventral hairs on middle part of hind tibiae stiff and deliquescent, about 16 - 20 (27) μ m. Dorsal hairs are shorter, 8-10 (15) μ m long.

Hind tarsal segment II 98-118 μ m long and it is 0.85 – 1.14 times as long as the base of antennal VI. First tarsal chaetotaxy 3,3,2.

Dorsum mostly membranous, very reticulated and with variable sclerotization. The sclerites are the following: a) spiraculars; b) intersegmentals; and very developed in the abdominal segments IV and V. These same sclerites are fairly large in the abdominal segment VI with a tendency of joining together at the spinal position; d) small and narrow spinal bar on the urite VII; e) a bar on the urite VIII which is always well formed.

Dorsal abdominal hairs sparse, deliquescent and very short: hairs on urite III are 11 μ m long, and on urite VIII 9 – 16 μ m long. There are 4 or 5 (exceptionally 7) hairs on urite VIII.

Siphunculi are somewthat volcano-like, difficult to measure exactly, are about 50-77 μ m long, about 0.53 – 0.70 (0.94) as long as cauda and 0.033 – 0.053 of body length.

Genital plate with 2 hairs on anterior half and 4 - 6 at posterior margin.

Bradly triangular cauda, with pronounced concavity, heavily spinulated with the majority of spines being very strong. The length of the cauda is $77 - 104 \mu m$ (exceptionally 68 and 118 μm , 0.55 - 0.63 as long as wide at base, bearing 16 - 26 (33) hairs.

Alate viviparous female (24 specimens) (Fig 8):

Very similar to the apterous. There we give some characteristics which are somewhat different.



Figs 18-21: 18,20: *Aphis (Absinthapis) cinae* (Nevsky), apterous viviparous female. 19, 21: *A. (Ab.) georgii* n.sp., apterous viviparous female. 18,19: hind leg. 20, 21: tarsus. Without pigmentation.

Ultimate rostral segment $0.109 - 0.136 \text{ mm} \log 1 - 1.1 \text{ times as}$ long as hind tarsal segment II.

The tibia/body proportion reachs 0.49. The hind tibia ventral hairs are somewhat longer than those on the apterous reaching $18 - 22 \mu m$. Hind tarsal segment II 0.104 – 0.123 mm long and 0.90 – 1.09 times as long as basal part of antennal segment VI.

Winged males (9 specimens) (Figs 9,17):

Very similar to the winged viviparous females, 1.08 - 1.23 mm long. The measurements are very similar to those of the apterous. The following are the characteristics which show some differences.

Antennae with 6 antennal joints, 0.71 - 0.89 mm long, 0.61 - 0.76 times the body length. Antennal segment III 0.168 - 0.254 mm long and 0.88 - 1.21 times as long as antennal segment VI.

Basis of ultimate antennal joint 0.109 – 0.145 mm long. 20 – 28 secondary rhinaria on antennal joint III, 8 – 12 rhinaria on joint IV and 5 – 12 on joint V. Ultimate rostral segment 0.091 - 0.114 mm long, 0.91 - 1.03 times as long as hind tarsal segment II.

Hind femur 0.24 - 0.33 mm long and 0.22 - 0.28 times as long as body length. Proportion tibia/body reachs 0.56.

Male genitalia with apical rounded claspers and a short triangular and pointed basal part of aedeagus.

Holotype: viviparous apterous female (n° 13), Spain: Avila province, Barraco (30TUK6082, 1100 m), *Artemisia campestris* subsp. *glutinosa* 1-XI-85 (Dpto. Biología Animal, Universidad de León, Spain).

Paratypes: 118 viviparous apterous females and 24 alate viviparous females, Spain: Madrid province, Aranjuez, Laguna de Ontígola, (30TVK4830, 600 m) 6-VI-85 and 7-VI-65 (Remaudière leg.); Avila province, Barraco, 8-VI-85 and 1-XI-85; and 9 winged males, Spain: Avila province, Barraco, 1-XI-85; all on *A. campestris* subsp. *glutinosa*. (Dpto. de Biología Animal, Universidad de León, Spain; British Museum (Natural History) London; Estaçao Agronómica Nacional, Oeiras, Portugal, Instituto di Entomologia, Università di Catania, Italia and Naturhistorisches Museum, Basel).

Biology: Although oviparous females were not caught; if we take note of the dates when males were collected and the biology of the other species, there is no doubt that the species is monoecious and holocyclical. The only known host plant, which is very possibly the only one, the species lives on is *Artemisia campestris* L. subsp. *glutinosa* (Gay ex Basser) Batt, in Batt et Trabut. *A. (Ab.) georgii* n. sp. is parasited by *Lysiphlebus hispanus* (Starý et Remaudière) (STARY & REMAUDIÈRE, 1973).

Taxonomic position:

Aphis (Absinthapis) safavii n. n. (Tab. 1) is well differentiated from the other seven species because of the shape and lenght of the ultimate rostral segment (see Tab. 1: 15,16 and 17) and because of the great lenght of the hairs (see 22, 23, 26 and 27), for instance the lenght of dorsal and ventral hairs of abdomen is similar (REMAUDIÈRE & DAVATCHI, 1959). The rest of the species can be placed into two groups:

a) those which have tubercles on segments II to VI or in some of them: *A. (Ab.) hortobagyi, A. (Ab.) judenkoi* and *A. (Ab.) pannonica*; these species are well differentiated from one another by SZELEGIEWICZ (1959 and 1978): *A. (Ab.) judenkoi* because of the shape and size of the hairs and the other two because of the length of the ultimate rostral segment and of the processus terminalis of joint VI (see 13, 15 and 17).

b) Without tubercles on segments II to VI: A. (Ab.) cinae, A. (Ab.) hirsuta, A.(Ab.) tashevella y A. (Ab.) georgii n. sp.. There are some pigmentation (see Tab. 1:5) differences between them (a characteristic of no importance), and differences in the chaetotaxy as can be seen in Tab. 1 (22, 23, 26 and 27) and in Figs 10, 12, 14, 18, 20 in the case of *Aphis (Absinthaphis) cinae*.

Apart from these differences, we show that the proportion «dorsal femoral hair length/trochantero-femoral dimater» is less, than 0,33 in *A*. (*Ab*.) georgii and is always more than 0,5, and sometimes reaching 1, in *A*. (*Ab*.) cinae.

Résumé

Le sous-genre Absinthaphis comprend huit espèces. Aphis (Ab.) cinae, A.(Ab.) hirsuta, A. (Ab.) hortobagyi, A. (Ab.) judenkoi, A. (Ab.) koraiensis, A. (Ab.) pannonica, A. (Ab.) safavii Remaudière, n. n. pro A. (Ab.) alba et A. (Ab.) thasevella. Une nouvelle espèce d' Espagne est décrit ici: A. (Ab.) georgii n. sp.

La position taxonomique du sous-genre et de ses espèces est discutée.

Quelques caractères diagnostiques de *Absinthaphis* peuvent être considérés biotypiques et sont semblables à ceux des espèces d'autres genres inféodés aux espèces du même groupe de Compositae. Néanmois il y en a d'autres qui sont partiellement ou totalement absents chez d'autres espèces du sous-genre *Aphis* et qui vivent sur les mêmes plantes.

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