

***Arboridia erecta* (Ribaut, 1931) (Hemiptera, Cicadellidae),  
a new leafhopper to the fauna of the Iberian Peninsula,  
and data on the distribution of *Arboridia parvula*  
(Boheman, 1845)**

***Arboridia erecta* (Ribaut, 1931) (Hemiptera, Cicadellidae), una cigarrilla  
nueva para la fauna de la Península Ibérica, y datos sobre la  
distribución de *Arboridia parvula* (Boheman, 1845)**

D. AGUIN POMBO

Department of Biology. University of Madeira. Campus da Penteada. 9000 Funchal. Madeira. Portugal.

CICA, Centre of Investigation in Agricultural Sciences. University of Madeira. Campus da Penteada. 9000 Funchal. Madeira. Portugal. aguin@uma.pt.

Recibido el 17 de mayo de 2001. Aceptado el 15 de julio de 2001.

ISSN: 1130-4251 (2001), vol. 12, 101-107.

**Key words:** Hemiptera, leafhoppers, *Arboridia*, Iberian Peninsula, distribution.

**Palabras clave:** Hemiptera, cigarrillas, *Arboridia*, Península Ibérica, distribución.

### SUMMARY

The genus *Arboridia* comprises about fifteen species in Europe. Of these, only two species, *A. parvula* and *A. ribauti*, had been recorded to Spain. This work reports *Arboridia erecta* for the first to the Iberian Peninsula. Food-plant associations, preferable habitats and data on distribution on the Northwest of Spain are provided for *A. parvula* and *A. erecta*.

### RESUMEN

El género *Arboridia* comprende alrededor de quince especies en Europa. Sólo dos de ellas: *A. parvula* y *A. ribauti*, habían sido citadas para España. En este trabajo se cita por vez primera la presencia de *Arboridia erecta* en la Península Ibérica. Para esta especie y para *A. parvula* se dan datos sobre las plantas nutricias, hábitats preferenciales y distribución en el noroeste de España.

## INTRODUCTION

Leafhoppers of the genus *Arboridia* are very similar morphologically. Most species feed on leaf-mesophyll tissue of deciduous trees and shrubs. Some species are, however, able to switch from natural ecosystems to cultures becoming pests to vineyards in the Palaearctic and Oriental Regions (Vidano, 1967; Vidano & Arzone, 1983; Vidano *et al.*, 1988; Bournier, 1976); at least six species of this genus are pests to *Vitis vinifera*. Of these: *A. dalmatina* infests vineyards in Europe, Bulgaria and former Yugoslavia, *A. adanae* in Turkey and Israel, *A. hussaini* in Iraq, *A. kermanshah* in Iran, *A. viniferata* in India and *A. apicalis* in Japan (Mostaan & Akhbarzadeh, 1995; Sohi *et al.*, 1975; Sohi & Sandhu, 1971; Tanaka *et al.*, 1986; Vidano & Arzone, 1983).

Successful control of these pest species requires a complete knowledge of their taxonomy together with other detailed studies on their biology, ecology, distribution, phytopathology and epidemiology (Vidano & Arzone, 1983). This genus is still poorly understood in Spain and Portugal despite these countries' being important growers of vine which are seriously affected by leafhoppers (López *et al.*, 1998; Quartau, *et al.*, 1989; Quartau & Rebelo, 1992; Ruiz Castro & Mendizabal, 1939; Ruiz Castro, 1943). The only two species recorded in the Iberian Peninsula, *A. parvula* and *A. ribauti*, are also two of the Europe's most widespread species (Nast, 1972, 1987; Morris, 1983).

This work provides new records and information on distribution and host plants, which may lead to a better understanding of the ecology and distribution of the species of this genus.

## MATERIAL AND METHODS

Specimens were sampled by sweeping with a net on plant foliage. Male genitalia were macerated in 10% KOH, then rinsed in distilled water and placed in a drop of glycerine to be examined under the stereomicroscope. For an accurate identification of leafhoppers it is useful and sometimes necessary to know also host plant associations and so a list of food plants has been compiled from the literature (Table I).

Twenty eight male specimens were examined. Females of *A. erecta* and *A. parvula* are difficult to distinguish. In this study they could not be ascribed to male specimens from the same sample, because these two species coexist contemporaneously in the same localities and feed upon the same plants.

Table I.—Food plants reported in the scientific literature for the two leafhopper species (1= Arzone & Vidano, 1987; 1= Dworakowska, 1970; 3= Günthart, 1971; 4= Günthart, 1987a; 5= Günthart, 1987b; 6= Günthart, 1987c; 7= Jankovic, 1984; 8= Le Quesne & Payne, 1981; 9= Linnavuori, 1952; 10= Moravskaja, 1948; 11= Ossiannilsson, 1981; 12= Ribaut, 1936; 13= Schiemenz, 1990; 14= Vidano *et al.*, 1987a; 15= Vidano *et al.*, 1987b).

Tabla I.—Plantas nutricias referidas en la bibliografía científica para las dos especies de cigarrillas (1= Arzone y Vidano, 1987; 1= Dworakowska, 1970; 3= Günthart, 1971; 4= Günthart, 1987a; 5= Günthart, 1987b; 6= Günthart, 1987c; 7= Jankovic, 1984; 8= Le Quesne y Payne, 1981; 9= Linnavuori, 1952; 10= Moravskaja, 1948; 11= Ossiannilsson, 1981; 12= Ribaut, 1936; 13= Schiemenz, 1990; 14= Vidano *et al.*, 1987a; 15= Vidano *et al.*, 1987b).

<i>Species</i>	<i>Specificity</i>	<i>Plant Families</i>	<i>Plant Species</i>	<i>Literature</i>
<i>A. erecta</i>	Polyphagous on deciduous trees	CORYLACEAE	<i>Corylus avellana</i> L.	3
			<i>Corylus</i>	2, 7, 12
			<i>Carpinus</i>	6
		ACERACEAE	<i>Acer campestre</i> L.	4, 5,
			<i>Acer</i> sp.	2, 3, 7, 12
		TILIACEAE	<i>Tilia</i> sp.	2, 3, 7, 12
		FAGACEAE	<i>Malus</i>	3
			<i>Castanea sativa</i> Mill.	4; 5, 14
			<i>Quercus</i> sp.	3, 2, 4, 5
		ROSACEAE	<i>Prunus spinosa</i> L.	4, 5
			<i>Prunus avium</i> L.	4, 5
			<i>Malus</i>	6
		BETULACEAE	<i>Alnus</i> sp.	2
		ULMACEAE	<i>Ulmus</i> sp.	2
		<i>A. parvula</i>	Polyphagous on deciduous trees, shrubs and herbaceous plants	ROSACEAE
<i>Rubus chamaemorus</i> L.	5, 9			
<i>Rubus</i> sp.	2			
<i>Pyrus communis</i> L.	10			
<i>Sorbus aucuparia</i> L.	10			
<i>Filipendula ulmaria</i> (L.) Maxim.	2, 5, 10, 11			
<i>Rosa</i> sp.	2			
<i>Fragaria</i> sp.	2			
CORYLACEAE	<i>Corylus avellana</i> L.			
	<i>Carpinus betulus</i> L.			1
	<i>Carpinus</i>			13
BETULACEAE	<i>Alnus glutinosa</i> (L.) Gaertn.			15
	<i>Alnus incana</i> (L.) Moench			15
ULMACEAE	<i>Ulmus laevis</i> Pall.			10
FAGACEAE	<i>Castanea sativa</i> Mill.			14
	<i>Quercus robur</i> L.			14
	<i>Quercus cerris</i> L.			14
	<i>Quercus</i> spp.			6, 10, 13
	<i>Helianthemum</i>	8		
CISTACEAE	<i>Helianthemum</i>	8		
GERANIACEAE	<i>Geranium sanguineum</i> L.	10		

## RESULTS AND DISCUSSION

*Arboridia erecta* and *Arboridia parvula* are externally very similar in colour and appearance. The main differences among these species are found in the shape of the aedeagus, styles and anal horns of the male genital structures. There are also some differences in size and colour pattern: the body of *A. erecta* is larger and the coloured band present along the cubital cell is different (Ribaut, 1936).

These two species were sampled in the provinces of Lugo and Orense in the northwest of the Iberian Peninsula. Both coexist in the same locations and on the same plant, *Castanea sativa*, where they are considerably abundant. In Switzerland and Italy these two species are also associated with chestnut trees (Günthart, 1987a, 1987b; Vidano & Arzone, 1987a). In these two countries both species seem to be oligophagous, although a list of published host-plant records (Table I) shows that they feed on plants from several other families. Most of their host plants belong to the families *Corylaceae*, *Fagaceae*, *Rosaceae*, *Betulaceae* and *Ulmaceae*, as shown in table I. Although it is unknown why geographic variation in host associations exist within the same species, similar results have been frequently registered for other species of the same subfamily.

### **Arboridia erecta** (Ribaut, 1931)

This species is very easy to identify according to the shape of the male aedeagus and the apical part of the style (Moravskaja, 1948; Ribaut, 1936). In most specimens examined the lateral spines of the aedeagus are separated from the main branch, in a similar way to Ribaut's drawings (1936). A few individuals, however, showed a smaller distance between both structures.

*A. erecta* is a polyphagous species which feeds on deciduous tree species of several plant families (Günthart, 1971, 1987a, 1987b, 1987c; Jankovic, 1984). Most host plants belong to the families: *Fagaceae*, *Corylaceae*, *Aceraceae* and *Rosaceae* (Table I). It is recorded here for the first time in the Iberian Peninsula but is known in central and southern Europe, occurring from the Iberian Peninsula to southern Asia (Nast, 1972, 1987).

Material examined.— LUGO: Ribeira de Arriba, Quiroga, 600-700 m, 21.8.1994, 2 ♂♂, found after sweeping on different trees such as *Ulmus* sp. and *Corylus avellana*. Fistéus, Quiroga, 42° 30' N, 7° 12' W, 700 m, 21.8.1994, 7 ♂♂, on *Castanea sativa* Mill. ORENSE: Cerdeiras, Mouruás, 42° 21' N, 7° 17' W, 690 m, 21.8.94, 7 ♂♂, on *Castanea sativa*. All specimens were collected on chest nuts growing with *Quercus* spp. in coppices next to agriculture fields.

***Arboridia parvula*** (Boheman, 1845)

This species can be identified according to the shape of male aedeagus and stylus (Ribaut, 1936; Ossiannilsson, 1981).

In Finland and Switzerland it hibernates in the adult stage and has two generations per year, the adults being present throughout the summer (Günthart, 1987b; Linnavuori, 1952). Overwintering specimens have been observed in coniferous plants such as *Juniperus* (Günthart, 1987b; Schiemenz, 1990). In Spain this species was collected in summer on *Castanea sativa*. In Switzerland it is reported to be oligophagous and associated with *Filipendula ulmaria* and *Rubus idaeus* (Günthart, 1987b). On the other hand, the food-plant records published for several European countries, compiled in this study (Table I), show that this species is polyphagous, its host plants belonging to the families: *Rosaceae* (Dworakowska, 1970; Linnavuori, 1952; Moravskaja, 1948), *Ulmaceae* (Moravskaja, 1948), *Corylaceae* (Arzone & Vidano, 1987) and *Geraniaceae* (Moravskaja, 1948). In Italy adults have also been collected on plant species of the families *Fagaceae* and *Betulaceae* (Vidano & Arzone, 1987a, 1987b) but Le Quesne & Payne (1981) believe that *Helianthemum* (*Cistaceae*) may also be a food plant.

*A. parvula* is a Euro-Siberian species (Drosopoulos *et al.*, 1986; Nast, 1972, 1987) being present also in north Africa. In Spain, apart from Galicia, it has been recorded at Güejar in Granada (Chicote, 1880) and Calella in Barcelona (Cuní i Martorell, 1896).

Material examined.-LUGO: Ribeira de Arriba-Quiroga, 600-700 m, 21.8.1994, 3 ♂♂, found after sweeping on *Ulmus* and *Corylus avellana*. ORENSE: Cerdeiras, Mouruás, 42° 21' N, 7° 17' W, 790 m, 21.8.94, 8 ♂♂, on *Castanea sativa*. Viana do Bolo, Mouruás, 42° 10' N, 7° 5' W, 780 m, 21.8.1994, 1 ♂, after swiping on *Corylus avellana* and *Ulmus* sp. All specimens were sampled in areas containing clusters of chest nuts and oaks situated on mountain slopes, close to cultivated fields.

**ACKNOWLEDGEMENTS**

I thank Mario Franco and Domingos Rodriguez for their help with the translation of German and Russian literature respectively.

## REFERENCES

- ARZONE, A. & VIDANO, C., 1987. Typhlocybae of broadleaved trees and shrubs in Italy.3. Corylaceae. *Bollettino dell'Istituto di Entomologia Guido Grandi della Università di Bologna*, 41: 269-276.
- BOURNIER, A., 1976. Grape insects. *Annual Review of Entomology*, 22: 355-76.
- CHICOTE, C., 1880. Adiciones a la enumeración de los hemípteros observados en España y Portugal. *Anales de la Sociedad Española de Historia Natural*, 9: 125-203.
- CUNÍ I MARTORELL, M., 1896. Fauna entomológica de la villa de Calella (Cataluña, Provincia de Barcelona). *Annales de la Sociedad Española de Historia Natural*, 6: 281-339.
- DROSOPOULOS, S., ASCHE, M., & HOCH, H., 1986. A preliminary list and some notes on the Cicadomorpha (Homoptera-Auchenorrhyncha) collected in Greece. *Proceedings of the 2<sup>nd</sup> International Congress of Rhynchota Balkan Mikrolimni*, Grecia. 8-13.
- DWORAKOWSKA, I., 1970. On the genus *Arboridia* Zachv. (Auchenorrhyncha, Cicadellidae, Typhlocybae). *Bulletin de l'Academie Polonaise des Sciences. Sér. Sciences Biologiques*, 28: 607-615.
- GÜNTHART, H., 1971. Kleinzikaden (Typhlocybae) an Obstbäumen in der Schweiz. *Schweizerische Zeitschrift für Obst- und Weinbau*, 107: 285-306.
- 1987a. Für die Schweiz neue und wenig gesammelte Zikaden-Arten (Homoptera, Auchenorrhyncha), 2. Ergänzung. *Bulletin de la Société Entomologique Suisse*, 60: 83-105.
- 1987b. Oekologische Untersuchungen im Unterengadin. D8, Zikaden (Auchenorrhyncha). *Ergebnisse der wissenschaftlichen Untersuchungen im Schweizerischen Nationalpark*, 12: 203-299.
- 1987c. Comparison of the vertical distribution of leafhoppers –trapped between 5 and 155 m above the ground –with the ground population. *Proceedings of the 5<sup>th</sup> Auchenorrhyncha meeting, Turin, Italy, 7-11 Sept.*, 1-8.
- JANKOVIC, L., 1984. Homoptera Auchenorrhyncha (Insecta). *Fauna Durmitoria*, 1: 229-282. (In Serbian).
- LE QUESNE, W. J. & PAYNE, K. R., 1981. Cicadellidae (Typhlocybae) with a check list of the British Auchenorrhyncha (Hemiptera, Homoptera). *Handbooks for the identification of British Insects*, 2 (2c). Royal Entomological Society of London. Londres. 95 pp.
- LINNAUORI, R., 1952. Studies on the ecology and phenology of the leafhoppers (Homoptera) of Raisio (S. W. Finland). *Annales Zoologici Societatis Zoologicae Botanicae Fennicae "Vanamo"*, 14: 1-32.
- LÓPEZ, M. A., OCETE, R., OCETE, M. E., PÉREZ, M. A., KÁJATI, I., DANCSHÁZY, S., RÜLL, G., SZENDREY, G. & KAPTAS, T., 1998. Ensayo de técnicas blandas de control sobre *Jacobyasca lybica* De Berg. (Homoptera, Cicadellidae) y *Tetranychus urticae* Koch (Acari, Tetranychidae) en el Marco del Jerez. *Boletín de Sanidad Vegetal, Plagas*, 24: 127-142.
- MORAVSKAJA, A C., 1948. To the knowledge of the genus *Zyginidia* (Homoptera-Cicadina). *Nauchno-metodischeskye Zapiski*, 11: 198-207. (In Russian).
- MORRIS, M.G., 1983. Apuntes preliminares sobre capturas sistemáticas de Hemiptera-Auchenorrhyncha del Alto Aragón occidental en junio y julio de 1972. *Pirineos*, 118: 63-70.
- MOSTAAN, M. & AKHBARZADEH, G. A., 1995. Biology and ecology of grape leafhopper *Arboridia kermanshah* and possibility of its natural control in the vineyards of Oroumieh. *Proceedings of the 12<sup>th</sup> Iranian Plant Protection Congress, 2-7 September, Karadj.* 210.
- NAST, J., 1972. *Palaearctic Auchenorrhyncha (Homoptera). An annotated check list.* Polish Scientific Publishers. Varsovia. 499 pp.

- 1987. The Auchenorrhyncha (Homoptera) of Europe. *Annales Zoologici*, 40: 535-661.
- OSSIANNILSSON, F., 1981. The Auchenorrhyncha (Homoptera) of Fennoscandia and Denmark. Part 2. The families Cicadidae, Cercopidae, Membracidae and Cicadellidae (excl. Deltocephalinae). *Fauna Entomologica Scandinavica*, vol 7. Part 2. Scandinavian Science Press Ltd. Copenhagen. 223-593.
- QUARTAU, J. A., FANÇONY, A. I. & ANDRÉ, G., 1989. *Jacobiasca lybica* (Bergevin & Zanon, 1922) (Homoptera, Cicadellidae, Typhlocybinae). A new leafhopper infesting vineyards in southern Portugal. *Boletim da Sociedade Portuguesa de Entomologia*, 114: 129-133.
- QUARTAU, J. A. & REBELO, M.T. 1992. Estudos preliminares sobre cicadélidos que constituem pragas das vinhas em Portugal (Homoptera, Cicadellidae). *Boletín de Sanidade Vegetal. Plagas*, 18: 407-417.
- RIBAUT, H., 1936. Homoptères Auchenorrhynches 1. (Typhlocybidae). *Faune de France 31*. Paul Le Chevalier et Fils. París. 228 pp.
- RUÍZ CASTRO, A., 1943. Dos tiflocibidos nuevos en España que atacan a la vid y al pimiento. *Boletín de Patología Vegetal y Entomología Agrícola*, 12: 143-189.
- RUÍZ CASTRO, A. & MENDIZÁBAL, M., 1939. La «roya colorada», producida por *Empoasca lybica* de Bergevin (Hem. Hom.), en los parrales de Almería. *Boletín de Patología Vegetal y Entomología Agrícola*, 8: 150-181.
- SHIEMENZ, H., 1990. Beiträge zur Insektenfauna der DDR: Homoptera – Auchenorrhyncha (Cicadina) (Insecta). Teil III. Unterfamilie Typhlocybinae. *Faunistische Abhandlungen Staatliches Museum für Tierkunde Dresden*, 17: 141-188.
- SOHI, A. S. & SANDHU, P. K., 1971. *Arborifera* – a new subgenus of *Arboridia* Zachv. (Typhlocybinae, Cicadellidae) from Punjab, India, with description of its immature stages. *Bulletin de L'Académie Polonaise des Sciences. Sér. Sciences Biologiques*, 19: 401-406.
- SOHI, B. S., BINDRA, O. S. & SOHI, A. S., 1975. Effectiveness of insecticidal sprays against grape-vine cicadellid, *Arboridia (Arborifera) viniferata* Sohi and Sandhu in the Punjab, India. *Indian Journal of Horticulture*, 32: 68-70.
- TANAKA, F., KONDO, A. & HENMI, T., 1986. Catches of the grape leafhopper, *Arboridia apicalis* (Homoptera: Cicadellidae), on yellow cylindrical sticky trap. *Japanese Journal of Applied Entomology and Zoology*, 30: 305-307 (In Japanese).
- VIDANO, C., 1967. Sintomatologia esterna ed interna da insetti fitomizi su vitis. *Annali della Accademia di Agricoltura di Torino*, 109: 117-136.
- VIDANO, C. & ARZONE, A., 1983. Biotaxonomy and epidemiology of Typhlocybinae on vine. *Proceedings of the 1<sup>st</sup> International Workshop on leafhoppers and planthoppers of Economic importance Commonwealth Institute of Entomology*, 75-85.
- 1987a. Typhlocybinae of broad-leaved trees and shrubs in Italy. 4. Fagaceae. *Redia*, 70: 171-189.
- 1987b. Typhlocybinae of broadleaved trees and shrubs in Italy. 2. Betulaceae. *Bollettino dell'Istituto di Entomologia Guido Grandi della Università di Bologna*, 41: 257-267.
- VIDANO, C. & ARZONE, A., & ARNO, C., 1988. Role of abiotic and biotic factors on diffusion and control of grapevine Auchenorrhyncha. R. Cavalloro (Ed.) *Influence of environmental factors on the control of grape pests, diseases and weeds*. Commission of the European Communities. Rotterdam, 125-133.