

# First report in Italy of *Stomaphis cupressi caucasica* Mamontova (Aphididae Lachninae)

Francesco BINAZZI<sup>1</sup>, Paolo TOCCAFONDI<sup>1</sup>, Andrea BINAZZI<sup>2</sup>, Pio Federico ROVERSI<sup>1</sup>, Fabrizio PENNACCHIO<sup>1</sup>

<sup>1</sup>Italian National Reference Institute for Plant Protection Research - (Center for Plant Protection and Certification - CREA-DC), Cascine del Riccio, Florence, Italy

<sup>2</sup>Bagno a Ripoli, Florence, Italy

## Abstract

*Stomaphis cupressi caucasica* Mamontova 1982 is reported for the first time in Italy. Apterous and alate viviparous females were collected from *Cupressus sempervirens* and *Cupressus arizonica* in hilly areas of Tuscany. Morphological redescription of *St. cupressi caucasica* is given with figures of antennae. A key to separate the *St. cupressi caucasica* from the nominotypical *St. cupressi cupressi* is included together with some bio-ecological and bio-geographical information.

**Key words:** Aphididae, Lachninae, *Stomaphis*, *Cupressus*, Italian regions.

## Introduction

*Stomaphis* Walker 1870 is a Palearctic genus of the Lachninae including 33 described species, most of which are recorded from eastern Palearctic regions (Blackman and Eastop, 2023). The genus *Stomaphis* is very distinctive, comprising very large aphids with body up to 7 mm in length. The long rostrum can reach 10 mm in length and enables the aphids to probe into bark crevices of trunks and main roots of host plants. These aphids are often difficult to detect on their host if not attended by ants. In fact, the majority of them usually show a cryptic way of life, as they often feed hidden within crevices, under bark plates, or live inside specific chambers built by ants. These structures are located within bark crevices or below the soil surface near the root collar and they are made of soil as well as plant material. For these reasons, several *Stomaphis* species have developed an obligate mutualistic relationship with ants and cannot survive without their interaction and protection (Roberti, 1991; Lorenz and Scheurer, 1998; Binazzi and Pennacchio, 2003; Depa *et al.*, 2012; 2017). Some species are able to exploit hosts of several plant genera, though most of them are oligophagous or monophagous. The majority of these aphids live on broad-leaved trees belonging to the families Aceraceae, Betulaceae, Fagaceae, Salicaceae and Ulmaceae.

To date, two species have been recorded from Cupressaceae, the former, *Stomaphis hirukawai* Sorin 1995 on *Chamaecyparis obtusa*, the latter, *Stomaphis cupressi*, with *St. cupressi cupressi* Pintera 1965, on species of *Cupressus* and *Juniperus* and *St. cupressi caucasica* Mamontova 1982, on *Cupressus sempervirens*.

The first species is reported from Japan while *St. cupressi cupressi* has been observed in western Europe and in East Africa (Kenya) (Pintera, 1965; Sorin, 1995; 2012; Blackman and Eastop, 2023). Conversely, *St. cupressi caucasica* had been recorded, so far, only along the Black Sea coast of Caucasus (Abkhazia and Gudauta) (Mamontova, 1982).

## Materials and methods

At the end of August 2016, a small colony of *Stomaphis* was observed by chance on the trunk base of an old *Cupressus sempervirens* tree (Mediterranean cypress) in a site close to Florence (Bagno a Ripoli), Tuscany, at 170 m a.s.l., 43°44'N 11°20'E. The aphids located at breast height were detected by the presence of ants (*Crematogaster* sp.) gathered around the colony. The colony consisted of a few apterous viviparous females at different developmental stages.

In the same year *Stomaphis* colonies were found in other sites close to Florence (Vernalese, 300 m a.s.l., 43°45'N 11°21'E; Incontro - Bagno a Ripoli, 300 m a.s.l., 43°45'N 11°21'E). The host plants were old Mediterranean cypress trees.

In the following years other colonies were detected on cypress trees in other localities of the same region. Collection data in table 1.

In the meantime, we received on loan from the NHM (Natural History Museum, London, UK) collection seven slides containing species of *Stomaphis* collected by D. Roberti on *Cupressus* (sic) from Italy. One of these slides contains four specimens (2 apterae plus 2 alatae) of *St. cupressi caucasica* (A.B. det.). This slide is labelled: “*Cupressus arizonica*, Bari, 3.v.76, *Stomaphis*”.

The specimens mentioned from Tuscany were mounted on slides and firstly identified (A.B.) as *St. cupressi* by means of the Pintera's original description (1965) and with the keys of Czylok and Blackman (1991), Petrović (1998) and Depa *et al.* (2012). Later on, the same specimens after comparison with the original description and figures of *St. cupressi caucasica* (Mamontova, 1982), appeared to agree with this one even though, unfortunately, it was not possible to observe the original types which were lost (Valery Korneyev, personal communication). Other works useful for identification were those of both Sanchís *et al.* (1996) and Nieto Nafria *et al.* (2003). At the same time, individuals were compared with the following mounted specimens from the Nieto Nafria's and

**Table 1.** Collection data of *St. cupressi caucasica* specimens from Tuscany. (F.B = Francesco Binazzi; A.B. = Andrea Binazzi; all specimens A.B. det.).

Legit	Site in Florence province	Host plant	Date	N. specimens	Morph
A.B.	La Croce - Bagno a Ripoli	<i>Cupressus sempervirens</i>	31.viii.16	1	aptera
A.B.	La Croce - B. a Ripoli	<i>Cupressus sempervirens</i>	25.ix.16	1	aptera
A.B.	Vernalese - B. a Ripoli	<i>Cupressus sempervirens</i>	25.ix.16	1	alata
FB.+A.B.	La Croce & Vernalese - B. a Ripoli	<i>Cupressus sempervirens</i>	viii-xi.16	11	9 apterae + 2 alatae
A.B.	Vernalese - B. a Ripoli	<i>Cupressus arizonica</i>	25.ix.18	1	aptera
F.B.	Colle Incontro - B. a Ripoli	<i>Cupressus arizonica</i>	08.xii.18	1	aptera
F.B.	Colle Incontro - B. a Ripoli	<i>Cupressus arizonica</i>	08.xii.18	1	alata
A.B.	Vernalese - B. a Ripoli	<i>Cupressus arizonica</i>	06.ix.19	2	apterae
A.B.	Vernalese - B. a Ripoli	<i>Cupressus arizonica</i>	13.ix.19	2	1 aptera + 1 alata
A.B.	Vernalese - B. a Ripoli	<i>Cupressus arizonica</i>	15.xii.19	1	alatoid nymph with embryos

Remaudière's collections, which are currently in the A.B. collection of CREA-DC: 3 apterae viv., 1 alata viv., Puebla San Miguel, Valencia, *Juniperus thurifera*, 02, 16.vii.92, leg. Sanchís & Michelena; 1 apt., La Torre, Valencia, 05.vii.92, idem as above; 2 apt., 1 alata, Manzanera, Teruel, 05.vii.92, idem as above; 5 al., La Torre, Valencia, 04.vi.92, idem as above; 2 apt., Ile de Yeu Vendée, *Cupressus macrocarpa lambertiana*, 15.xi.73, leg. and det. Remaudière (as *St. graffii*) (for a total of 8 apterae and 7 alatae).

## Results

All the individuals collected in Tuscany were identified (A.B.) as:

*Stomaphis cupressi caucasica* Mamontova 1982, of which a brief redescription is given.

### Apterous viviparous female

(from 9 specimens) (figure 1; table 1)

Body length 5.1-6.2 mm. The dorsal colour of live specimens is a light green-brown shiny tint partially covered by a faint whitish-grey wax powder on the pleuro-marginal surfaces. Head, pronotum and mesonotum dark brown sclerotized. Antennae 2.1-2.4 mm long. Antennal segments I-II, dark brown, the other segments, III-VI, uniformly brown. Metanotum with two marginal plates, sometimes with a marginal tubercle bearing hairs. Legs uniformly brown except for a paler short part of femora close to the trochanters. Tibiae with a little enlarged apical part, the same colour of tarsi. Abdominal tergites without sclerites, except for small traces of sclerotic areas on 7<sup>th</sup> tergite and a continuous sclerotic bar on 8<sup>th</sup> tergite. Siphuncular cones dark brown, large, sometimes with a nearly rectangular vertical shape. Cauda dusky and helmet-shaped. Genital plate bilobed and brown. Anal plate dusky. Abdominal hairs up to 0.110 mm long. Hairs on hind tibiae up to 0.080 mm long.

Antennal segments III and IV with 10-33 and 6-9 secondary rhinaria respectively, all rounded and arranged in a row, those on III on its entire length, sometimes with the exception of the basal fourth; primary rhinarium on

VI antennal segment shorter than processus terminalis. Hairs on III segment, fine and numerous, up to 0.050 mm long.

Labrum bearing 14-24 hairs on its elongated part.

### Alatae viviparous female

(from 2 specimens) (figure 2; table 1)

Body smaller than in apterae, 4.6-5.5 mm long. Head, prothorax and pterothorax, blackish. Siphuncular cones, sclerified. Band of abdominal tergite 8<sup>th</sup>, cauda and anal plate, dark brown. Most part of the abdomen pale brown. Antennae of the same colour as in aptera while legs are dusker. Body and appendages covered with numerous fine hairs a little longer than in apterae. Fore wings with bordered veins and media once forked. Hairs on abdominal tergites up to 0.120 mm long. Hairs on hind tibiae up to 0.110 mm long.

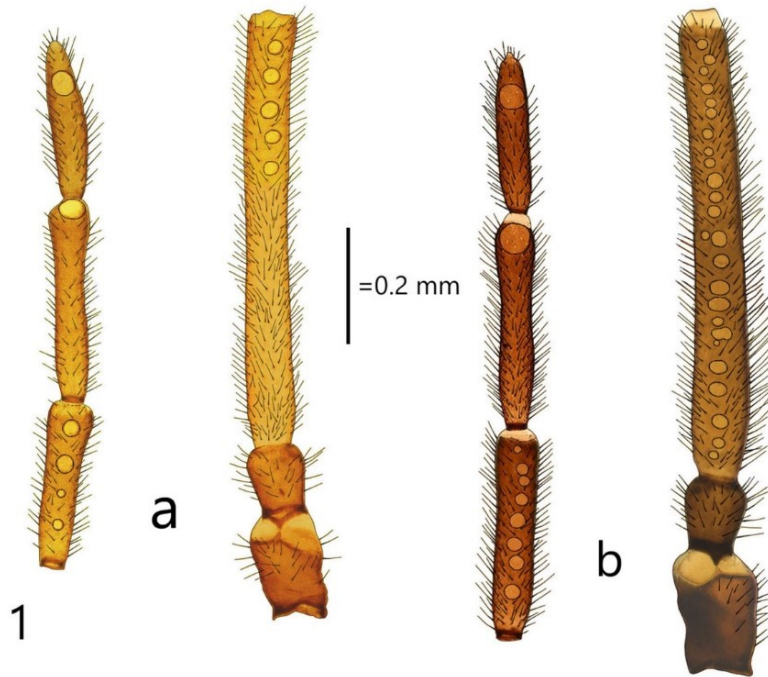
Antennae 1.9-2.2 mm long. Antennal segment III and IV with 29-37 and 7-9 secondary rhinaria respectively, all rounded, elliptical or quadrangular on their entire length and width. Hairs as in aptera.

Labrum bearing 12-20 hairs on its elongated part.

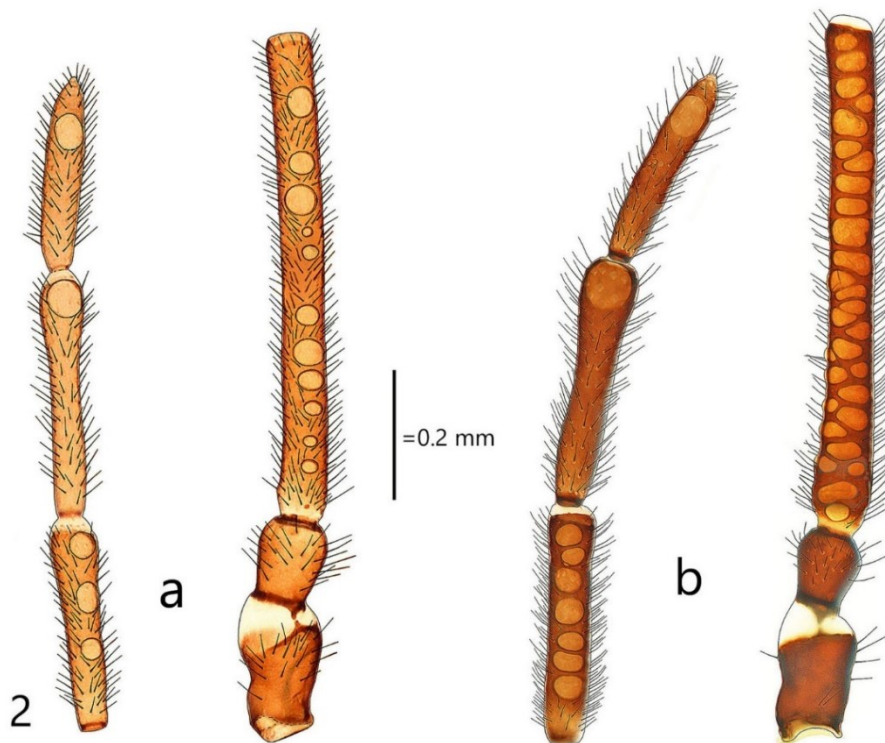
## Discussion

*St. cupressi* was described by Pintera in 1965 based on specimens collected on *Cupressus benthami* in Kenya. This species was originally attributed to the genus *Parastomaphis* Pašek 1953 which is currently regarded as a synonym of the previously described genus *Stomaphis* Walker 1870 (Remaudière and Remaudière, 1997). The *St. cupressi caucasica* was described by Mamontova in 1982 on the basis of material collected on *C. sempervirens* from Abkhazia (Georgia).

The main differences in apterae of *caucasica* vs *cupressi*, are: (1) higher number of secondary rhinaria in antennal segments III and IV (10-33 and 6-9 vs 2-14 and 3-8); (2) higher number of hairs on the distal elongated part of labrum (14-24 vs 0-3); (3) larger ratio of 2<sup>nd</sup> segment of hind tarsus to 2<sup>nd</sup> segment of middle tarsus (1.33-1.51 vs 1.22-1.33); in alatae the differences are: (1) antennal segment III with 29-37 rhinaria vs 12-25; (2) labrum with 12-20 hairs vs 0-9 (see box below).



**Figure 1.** Antennae of apterous viviparous females: (a) *Stomaphis cupressi cupressi*; (b) *St. cupressi caucasica*.



**Figure 2.** Antennae of alate viviparous females: (a) *Stomaphis cupressi cupressi*; (b) *St. cupressi caucasica*.

Mamontova's description of *St. cupressi caucasica* agrees with our material: in apterae, (1) in the antennal segments III and IV bearing 17-20 and 6-7 secondary rhinaria; (2) in the ratio basal part / processus terminalis of antennal segment VI, which is about 4.3; it agrees, in alatae, (1) in having 27-30 and 5-8 prominent and ellipti-

cal secondary rhinaria on antennal segments III and IV; (2) in the ratio basal part / processus terminalis being about 5.17.

Both subspecies of *St. cupressi* belong to the group of *Stomaphis* with a divided genital plate.

They can be separated as follows:

- |    |   |
|----|---|
| 1  | - Antennal segment III of apterae with 2-14 secondary rhinaria on its distal half. The same segment III in alatae bearing 12-25 secondary rhinaria, these ones rounded or elliptical, not on the entire width of the segment. Labrum in apterae with 0-3 hairs on its elongated part (except the broader more proximal part), in alatae with 0-9 hairs. Apterae with ratio 2 <sup>nd</sup> hind tarsus vs 2 <sup>nd</sup> middle tarsus, 1.22-1.33. On <i>Cupressus</i> and <i>Juniperus</i> . . . . . <i>St. cupressi cupressi</i> Pintera |
| -- | - Antennal segment III of apterae with 10-33 secondary rhinaria on its entire length. The same segment III in alatae with 29-37 secondary rhinaria on its entire length and width, these ones elliptical, subtriangular or quadrangular. Labrum in apterae with 14-24 hairs on its elongated part, in alatae with 12-20 hairs. Apterae with ratio 2 <sup>nd</sup> hind tarsus vs 2 <sup>nd</sup> middle tarsus, 1.33-1.51. On <i>Cupressus sempervirens</i> and <i>C. arizonica</i> . . . . . <i>St. cupressi caucasica</i> Mamontova       |

After the first report from Kenya, *St. cupressi cupressi*, had been reported from France, Spain, Italy, and Turkey (Roberti, 1993 -subsp. *Stomaphis longirostris* (F.) partim-; Sanchís *et al.*, 1996; Nieto Nafria *et al.*, 2003; Akyürek *et al.*, 2010; Barbagallo and Cocuzza, 2014; Blackman and Eastop, 2023).

The comparison of our “*St. cupressi* material” with that obtained from Spain and France (from Nieto’s and Remaudière’s collections) and with data from literature, allowed to assign the Italian individuals to the Mamontova’s taxon (*St. cupressi caucasica*). It is worth noting that for what concerns the identification of our Italian specimens, we relied on both our individuals and the above mentioned material received on loan from the NHM. Furthermore, Barbagallo and Cocuzza (2014) in their regional checklist for the Campania region, have mentioned the presence of *Stomaphis cupressi* (Pintera 1965), but referring only to the records from Ariano (Avellino) reported in Roberti’s paper (1993). Our specimens of *caucasica* from Tuscany are, thus, further findings for Italy following those of Roberti (2 apt., 2 al., *Cupressus arizonica*, Bari, 3.V.76, det A.B.), which are actually the first finding of *St. cupressi caucasica* in Italy but had been originally reported subsp. *longirostris*. Moreover, it is worth noting that this is, thus, also the first record of *Stomaphis cupressi caucasica* on the Nearctic host *C. arizonica*.

However, also *St. cupressi cupressi* was also found again during our researches. It consists of three alatae and one aptera collected in the site Incontro on *Cupressus arizonica* on 09.xi.2018 (alatae) and on 13.i.2020 (aptera) (det. A.B.).

The material from Spain and France remains assigned to the original Pintera’s *St. cupressi cupressi*.

Based on these findings, it can be hypothesised that *St. cupressi cupressi* has a western distribution ranging from France to Spain and Italy with some records in Africa (Kenya) as well. By contrast, the Mamontova’s *St. cupressi caucasica* might have a more eastern distribution, ranging from Italy to the Caucasus.

The biological and ethological observations on *Stomaphis* species reported by Depa *et al.* (2015) are, so far, consistent with our findings. In fact, in the *St. cupressi caucasica* colonies investigated in Tuscany, the sexuales generation was not recorded. Only apterous viviparous immature females were found to overwinter either hidden in bark crevices near the soil surface or in soil chambers built by ants below the litter and adjacent to the root collar of trees. Furthermore, in accordance with what has previously been reported for other *Stomaphis* species by Binazzi and Pennacchio (2003), parasitization was observed in some specimens of the above-mentioned colonies.

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**Authors' addresses:** Francesco BINAZZI (corresponding author: francesco.binazzi@crea.gov.it), Paolo TOCCAFONDI, Pio Federico ROVERSI, Fabrizio PENNACCHIO, Italian National Reference Institute for Plant Protection Research - (Center for Plant Protection and Certification - CREA-DC), via Lanciola 12/A, 50125 Cascine del Riccio, Florence, Italy; Andrea BINAZZI, via di Vernalese 41, 50012 Bagno a Ripoli, Florence, Italy.

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