

Ecological aspects of spittlebugs of the genus *Clastoptera* (Hemiptera: Cercopoidea: Clastopteridae), possible vectors of *Xylella fastidiosa* in olives in southeastern Brazil

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WHAT VECTORS ARE RELEVANT IN BRAZILIAN OLIVE ORCHARDS?

Ecological attributes:

- Natural occurrence/reproduction on the crop
- Population density/activity
- Natural infectivity
- Transmission efficiency



SURVEY OF VECTORS IN OLIVE ORCHARDS IN SOUTHEASTERN BRAZIL

Olive orchards over an altitudinal gradient - São Paulo (SP) and Minas Gerais (MG)

Sampling activities (2015-2019)

Five localities in SP and MG:



- Wenceslau Braz/MG – 1780 m
- S. Bento do Sapucaí/SP – 1510 m
- Maria da Fé/MG – 1320 m (3 orchards)
- Consolação/MG – 1170 m
- Cabreúva/SP – 880 m

• Yellow sticky cards



9 trees/orchard
2 cards/tree
(0.8 and 1.6 m)

cards changed
every 2 weeks

Olive canopy
(3 sweeps/tree; 60 trees)



Ground cover
(30 sweeps/sample)



Predominant (PD) species of sharpshooters and spittlebugs trapped by yellow sticky cards in olive orchards over an altitudinal gradient in Southeastern Brazil

Faunistic analysis

based on sticky trap catches
(2015-2017)

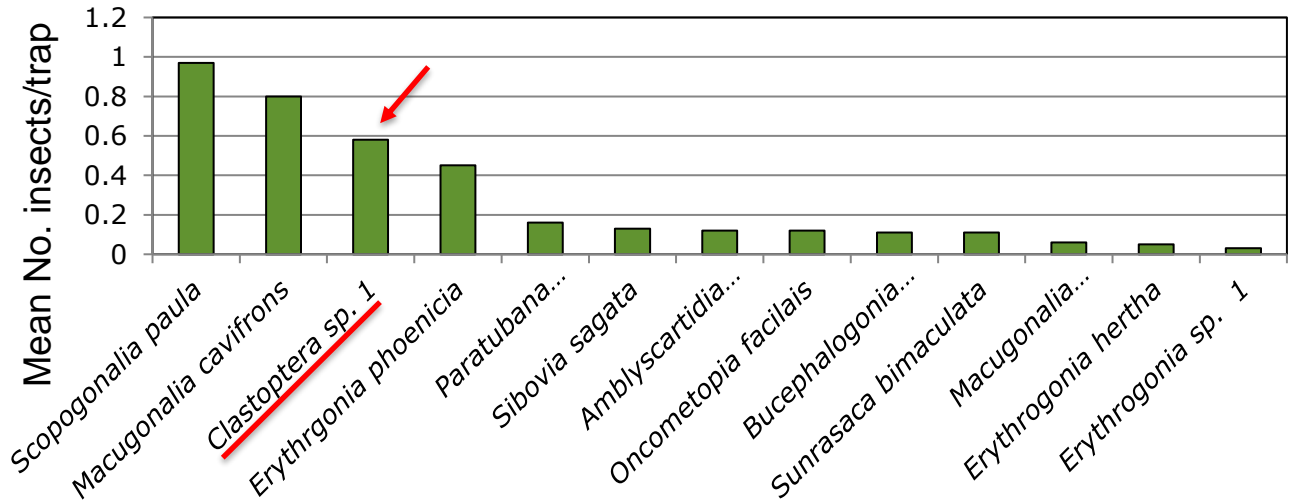
Xylem feeders	No. spp.	No. Individ.
Aphrophoridae	1	6
Cicadellinae:	96 (16*)	11,748 (79%)
Cercopidae:	4 (1)	464 (3%)
Clastopteridae:	5 (1)	2,653 (18%)*

* Predominant species based on faunistic analysis (highly abundant, frequent, constant and dominant)

Superfamily/Family	Orchard location (altitude - m) ¹						
	WB (1,780)	SB (1,512)	MF-Lg (1,329)	MF-Sç (1,318)	MF-At (1,310)	CS (1,166)	CB (883)
Cercopoidea							
Cercopidae							
<i>Sphenorhina rubra</i>	npd ²	npd	npd	PD	PD	npd	npd
Clastopteridae							
<i>Clastoptera</i> sp. 1	PD	PD	PD	PD	PD	PD	npd
Membracoidea							
Cicadellidae							
Cicadellinae, Cicadellini							
<i>Amblyscartidia pardalioia</i>	npd	PD	- ³	-	-	npd	-
<i>Bucephalogonia xanthophis</i>	npd	PD	PD	npd	PD	npd	npd
<i>Diedrocephala bimaculata</i>	npd	npd	npd	PD	npd	npd	npd
<i>Dilobopterus costalimai</i>	-	-	-	-	-	npd	PD
<i>Dilobopterus dispar</i>	-	npd	npd	PD	npd	npd	npd
<i>Erythrogonia hertha</i>	npd	npd	npd	npd	npd	PD	npd
<i>Erythrogonia phoenicia</i>	npd	npd	PD	PD	PD	PD	-
<i>Erythrogonia</i> sp. n.	-	-	npd	PD	PD	-	-
<i>Macugonalia cavifrons</i>	PD	PD	PD	PD	PD	PD	NPD
<i>Macugonalia leucomelas</i>	-	npd	npd	npd	PD	npd	npd
<i>Paratubana luteomaculata</i>	PD	PD	-	-	-	-	-
<i>Scopogonalia paula</i>	PD	PD	PD	PD	PD	PD	npd
<i>Scoposcartula tobiasi</i>	PD	-	-	-	-	-	-
<i>Sibovia sagata</i>	npd	PD	-	-	-	npd	npd
<i>Subrasaca bimaculata</i>	PD	PD	-	-	-	npd	-
Cicadellinae, Proconiini							
<i>Oncometopia facialis</i>	-	npd	PD	PD	PD	PD	npd

¹Municipalities in the states of Minas Gerais (MG) and São Paulo (SP), Brazil. WB: Wenceslau Braz/MG; SB: São Bento do Sapucaí/SP; MF: Maria da Fé/MG; CS: Consolação/MG; CB: Cabreúva/SP. ²PD: predominant; npd: non-predominant. ³not trapped.

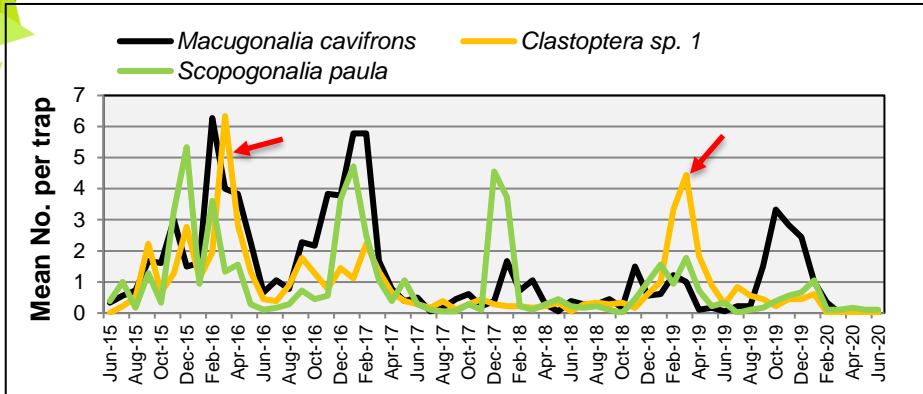
Population density of sharpshooters and spittlebugs species in yellow stick traps (2015-2020)



Pooled data of sampling in the olive orchards of the Mantiqueira Mountain Range Region in São Paulo (SP) and Minas Gerais (MG)

Population density and fluctuation of predominant shapshooters and spittlebugs (yellow sticky cards)

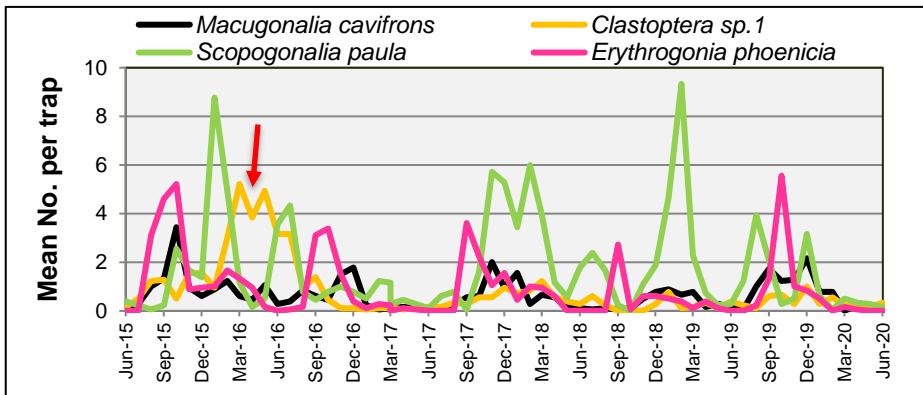
São Bento do Sapucaí – 1,512 m (elevation)



Winter: jun-sept
Spring: sept-dec
Summer: dec-mar
Autumn: mar-jun

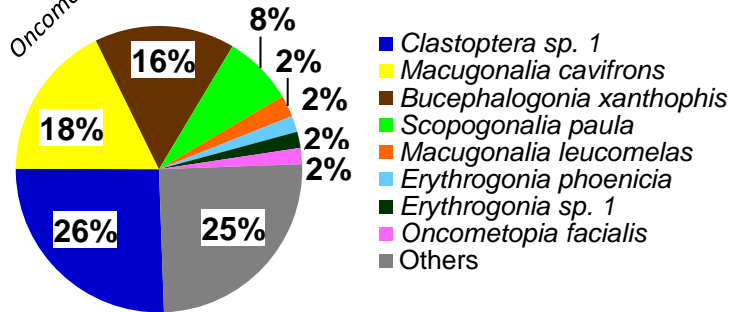
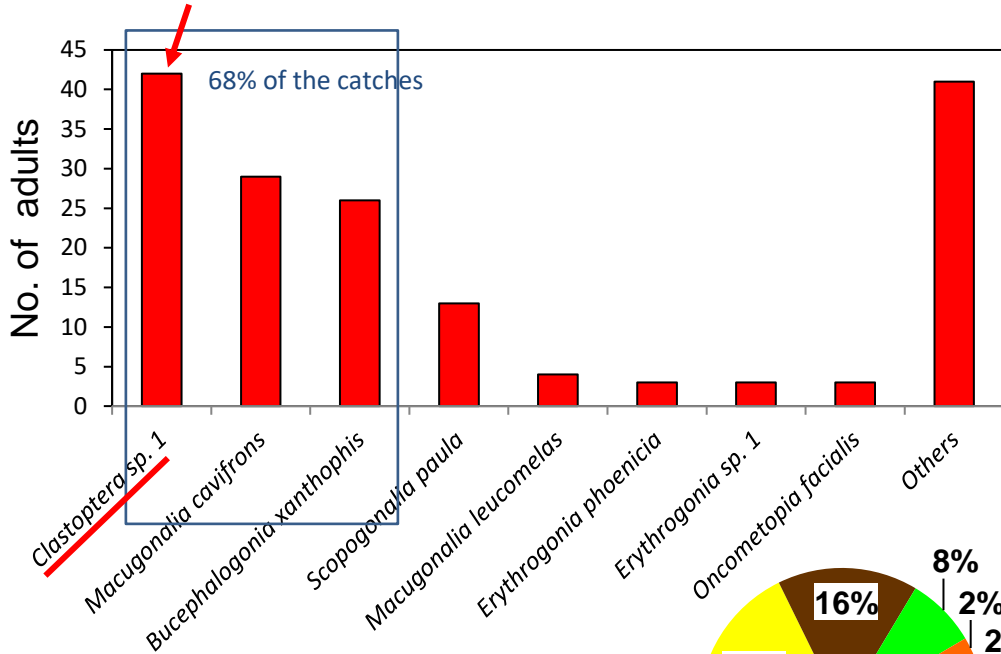
Clastoptera sp.1 peaks in late summer and early autumn (Feb-April)

Maria da Fé – 1,310 m



Presence on the olive canopies (sweep net)

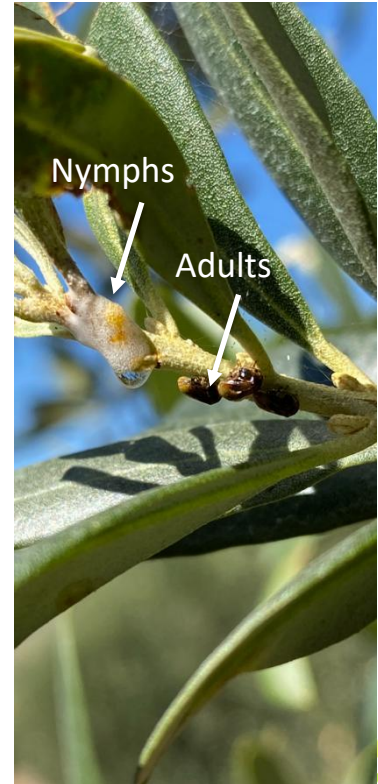
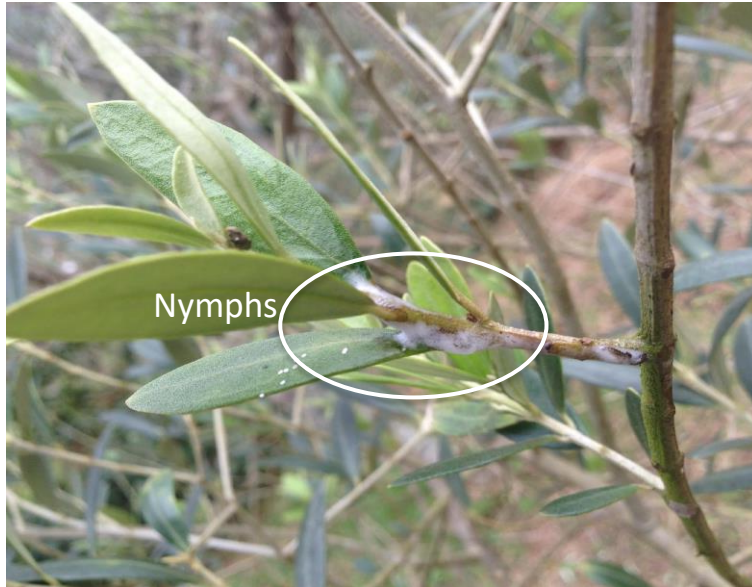
Frequency of sharpshooters and spittlebugs species collected with sweep net on the olive canopy (2015-2019)



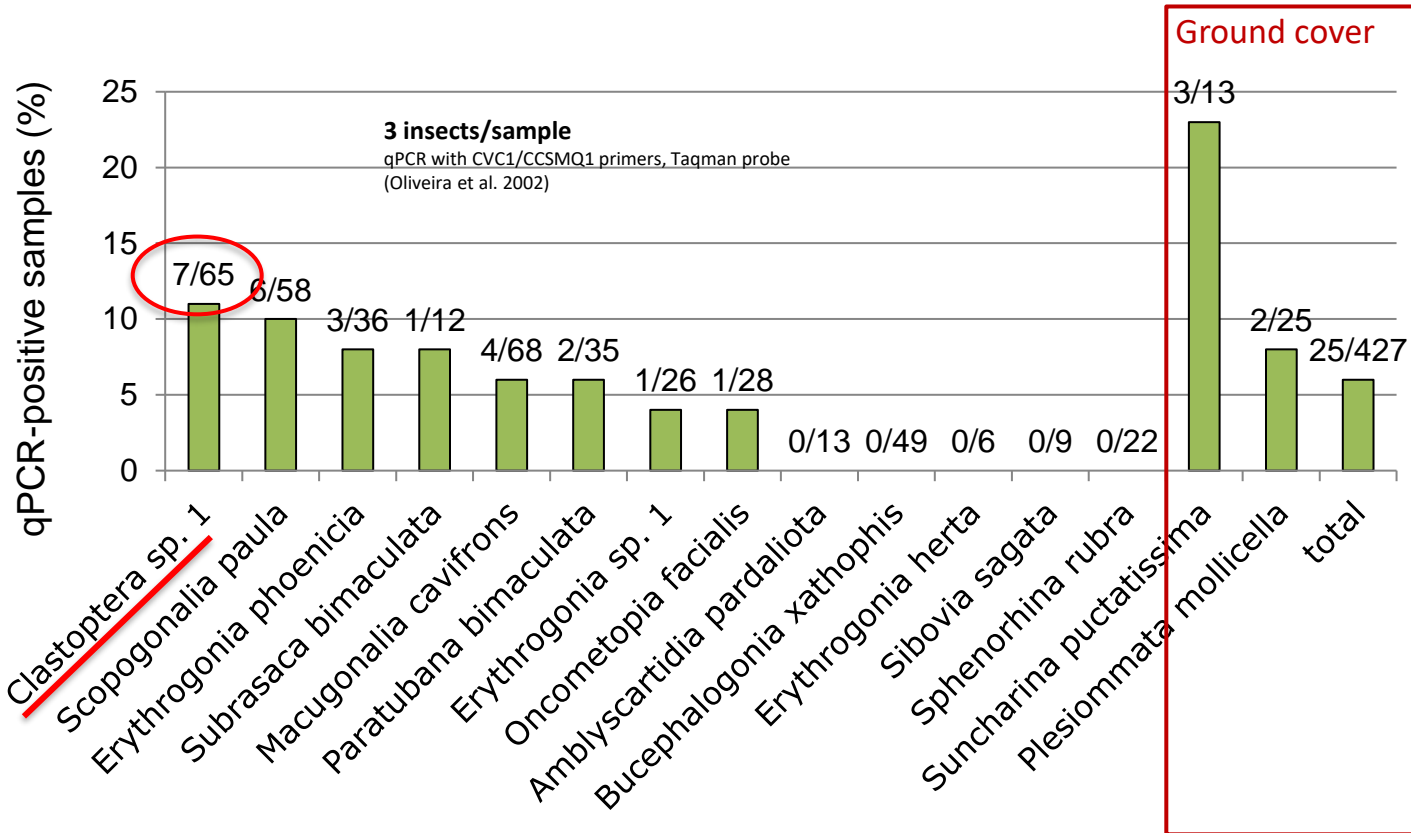
Visual observations on olive shoots

The species *Clastoptera* sp.1

- Nymphs/adults commonly observed on olive shoots
- Complete their development in the olive tree.



Natural infectivity of sharpshooters and spittlebugs (qPCR-positive for *X. fastidiosa*)



Host plants of the spittlebug *Clastoptera* sp.1



Duranta erecta



Salvia rosmarinus



Rhododendron sp.



Tibouchina mutabilis



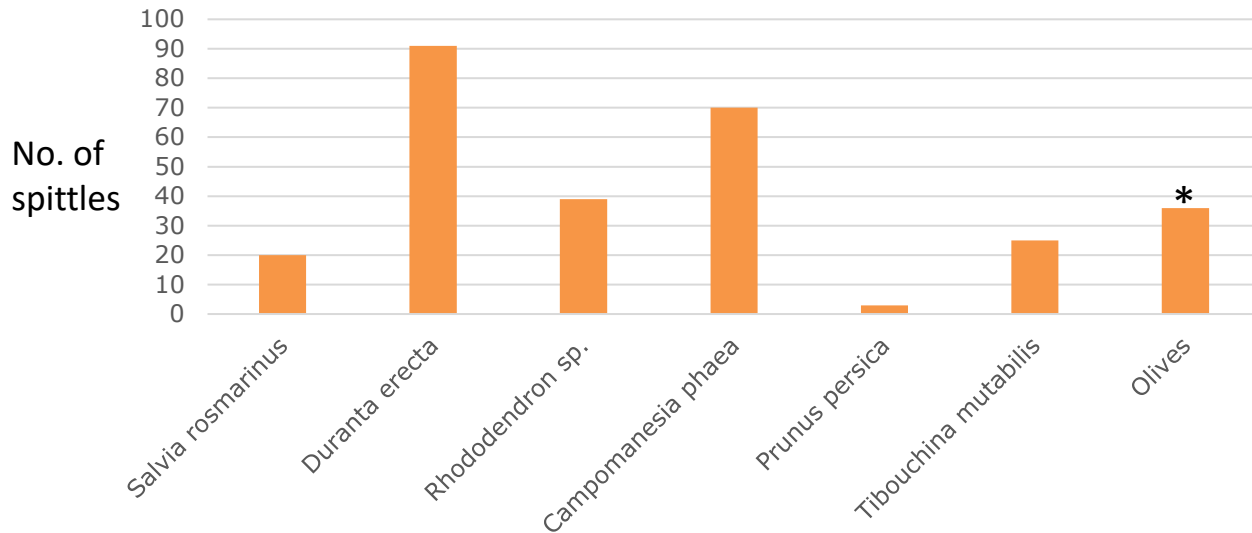
Prunus persica



Campomanesia phaea

Visual observation of *Clastoptera* sp.1 nymphs on shrubs and trees

Summer and Fall/2023



*Olives: average: summer and fall/2016-2018



CONCLUSIONS

Clastoptera sp1. likely plays a role in Xf spread because:

- It is a **prevalent in orchards** of the main olive growing region in southeastern Brazil
- Adults and nymphs **colonize olives and a number of shrubby and tree hosts** belonging to different botanical families around the orchards.
- Adults **naturally carry Xf** in infected olive orchards



NEXT DIRECTIONS

- To describe the new species of *Clastoptera* collected on olive trees and other trees/shrubs
- To assess the ability of *Clastoptera* sp1 to transmit *X. fastidiosa* to olive trees.

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