

Pilot study to evaluate alternative and eco-friendly methods for larval mosquito control in an urban area in northeast Italy

A. Michelutti¹, S. Vettore², F. Gradoni¹, S. Carlin¹, M. Micocci³, D. Bonetto², A. Drago², S. Martini², F. Montarsi¹

1. Istituto Zooprofilattico Sperimentale delle Venezie, Legnaro (PD), Italy.

2. Entostudio s.r.l, Ponte San Nicolò (PD), Italy

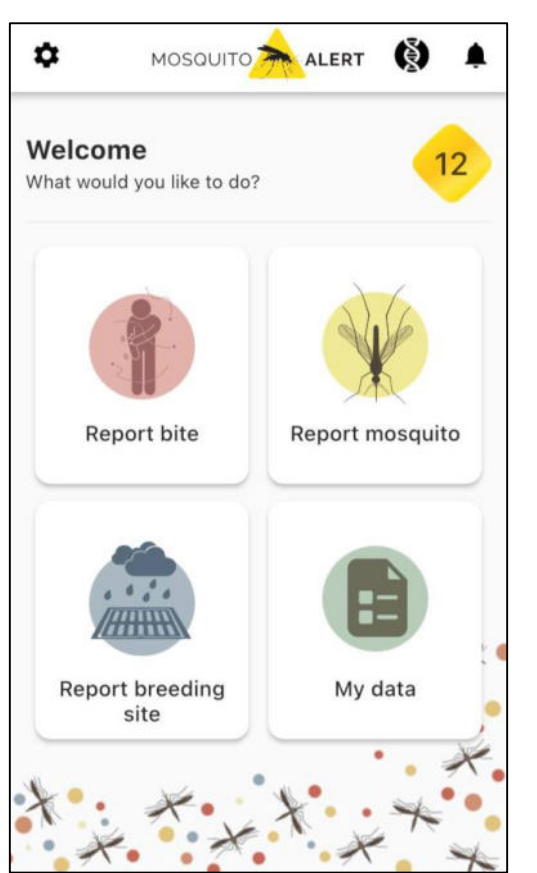
3. Department of Public Health and Infectious Diseases, University of Rome La Sapienza, Rome (RM), Italy

Introduction

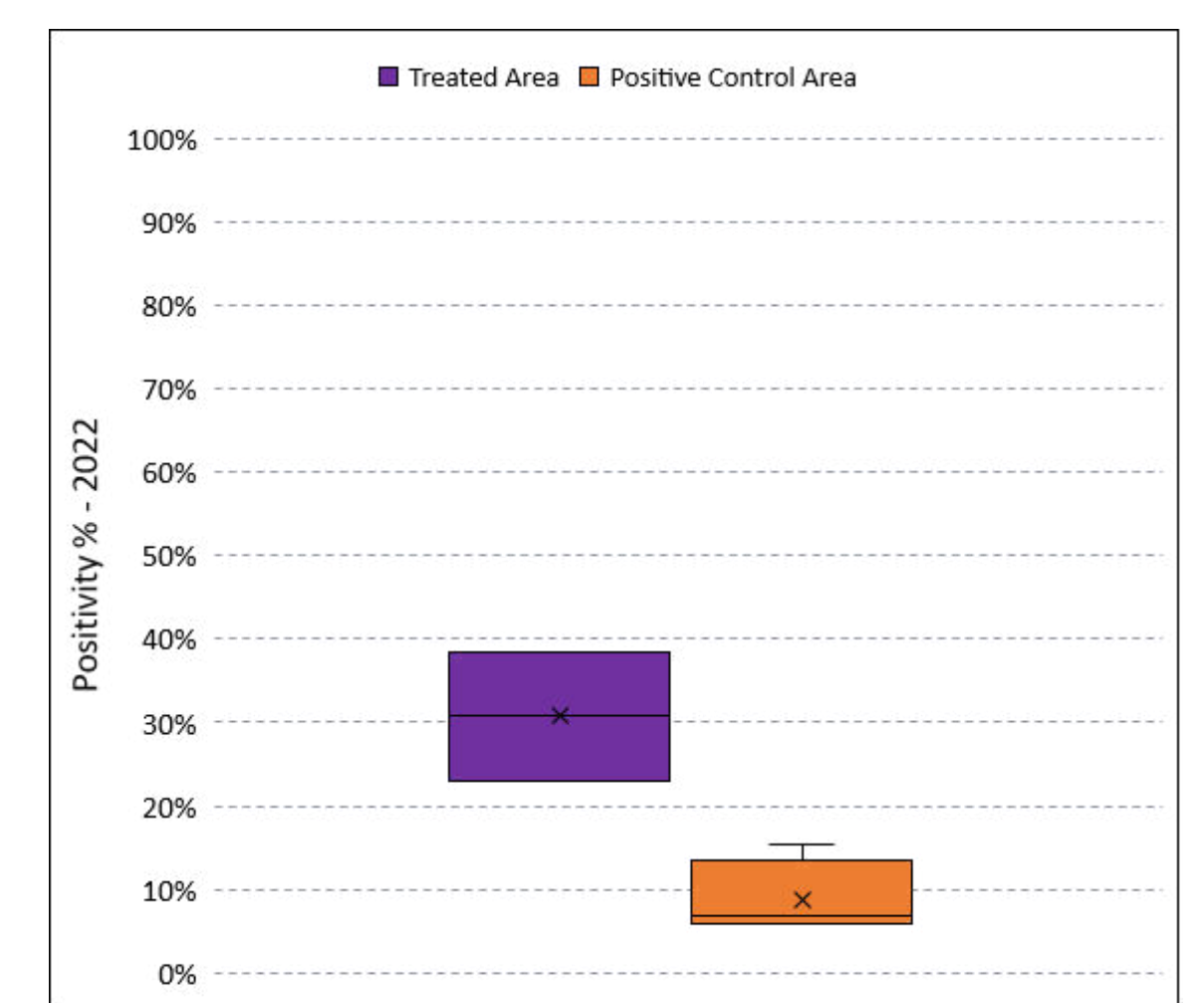
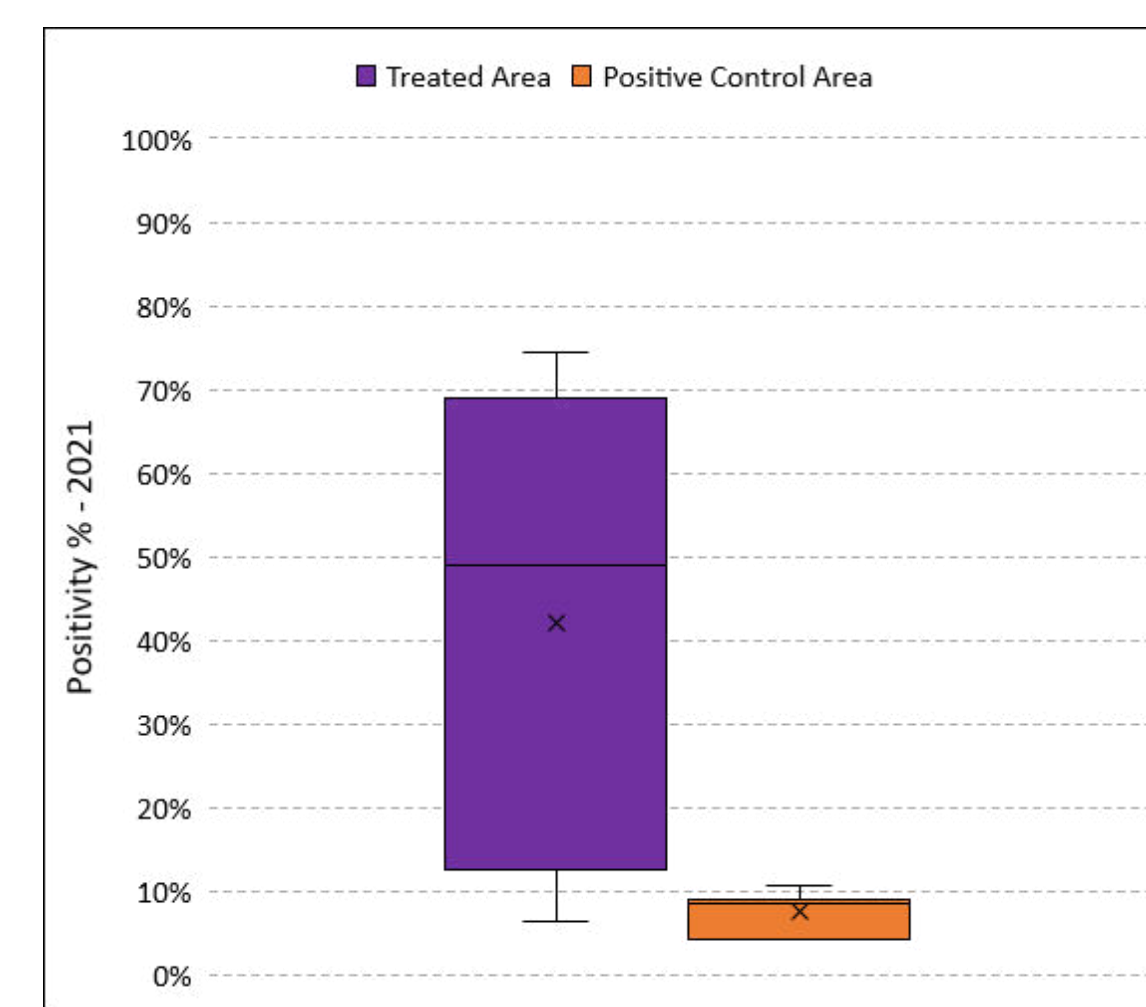
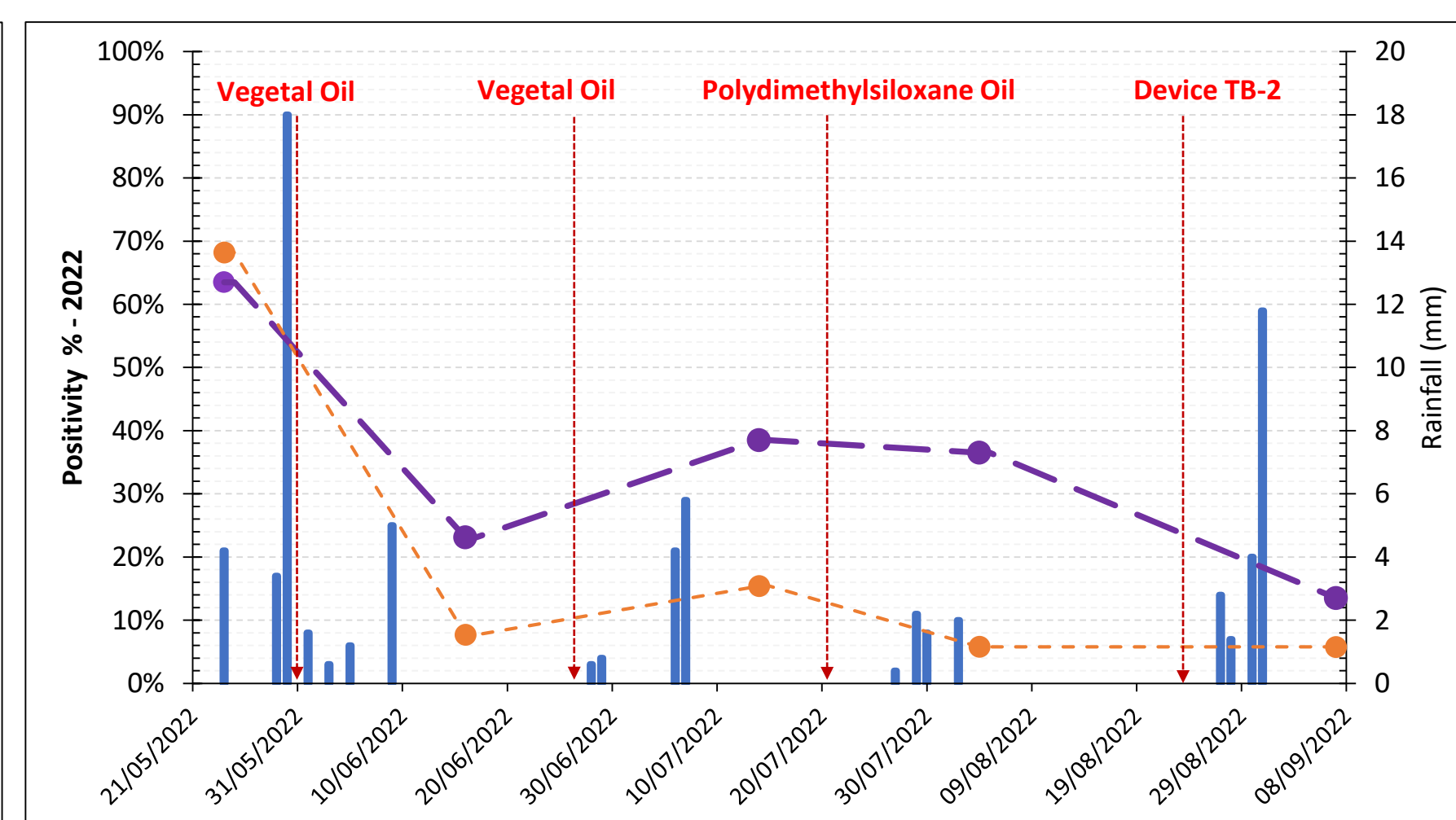
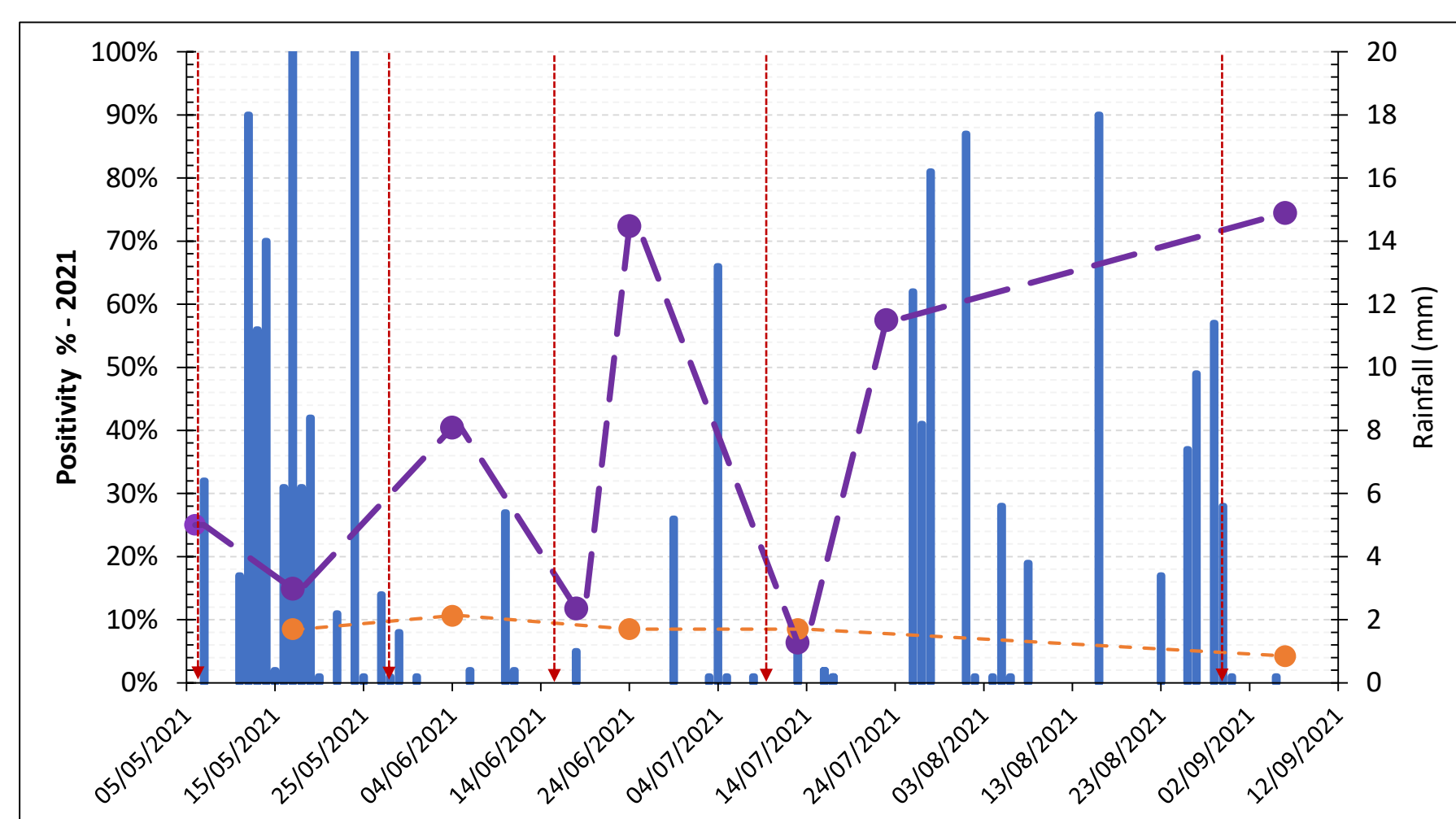
Mosquito control is one of the main preventive measures of mosquito-borne diseases transmission. In this study, we present the results of a pilot study where the use of a biodegradable larvicide, communication campaigns and citizen involvement have been implemented.

Materials and Methods

In Ponte di Piave (TV), a village in Northeastern Italy, we selected an area (treated area) where catch basins have been treated with a vegetal oil with physical-mechanical action and another one (positive control area) where they have been treated with Diflubenzuron, VectoMax[®] and Polydimethylsiloxane oil. In the treated area, we conducted a door-to-door campaign to inform the local population about mosquito health risks and provide biological larvicide for free. Citizen have been also invited to download and use the app Mosquito Alert[®], to engage mosquito monitoring.

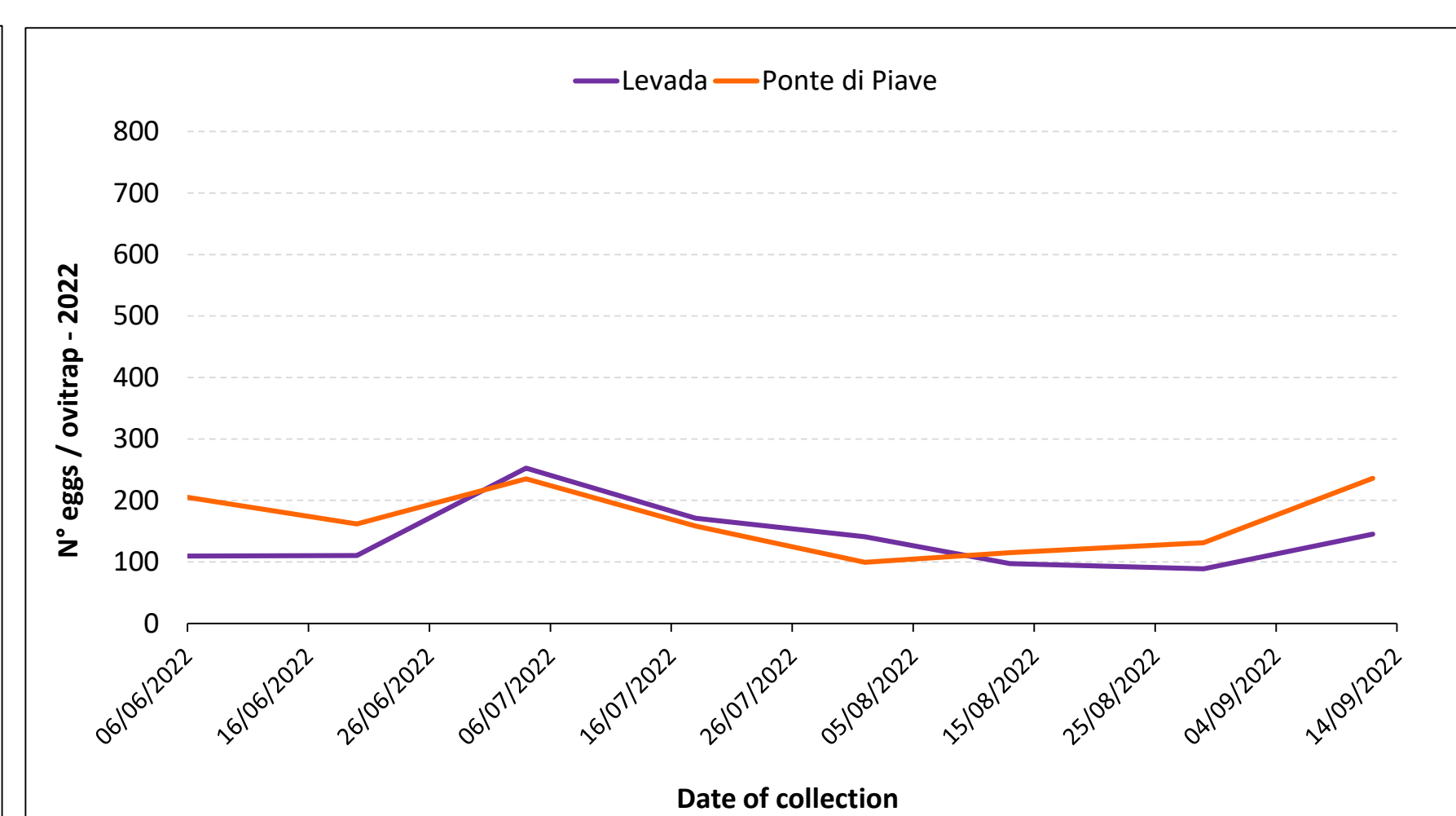
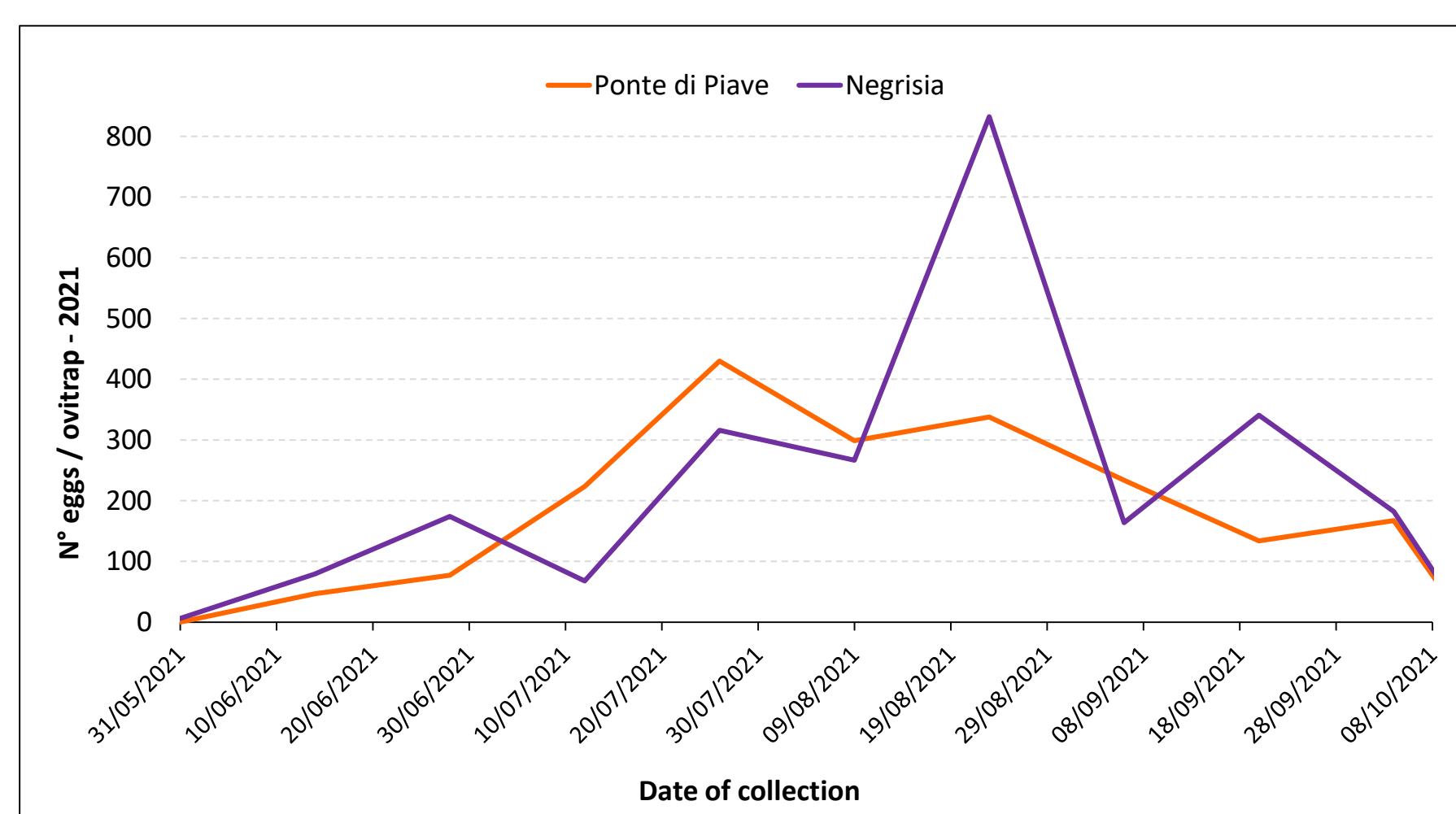


Results



Graphs report the number of catch basins positive to mosquito larvae in the treated (violet) and positive control area (orange), related to the date of intervention (red arrows) and rains (mm), in 2021 and 2022.

Graphs report the percentage of catch basins positive to mosquito larvae in the treated (violet) and positive control area (orange), in 2021 and 2022.



Seasonal trend of *Aedes* eggs abundance in the treated (violet) and positive control area (orange), in 2021 and 2022.



The photo shows how the uniform distribution of the vegetal oil, as well as silicon products, on the water surface depends on the presence of debris in the catch basin.

Discussion

In 2021, the vegetal oil has been applied at twice the dosage and at a higher frequency than expected. Despite this, the percentage of catch basins positive to mosquito larvae was higher in the treated than the control area.

In 2022, the composition of the vegetal oil has been improved by the company. The percentage of catch basins positive to mosquito larvae was still higher in the treated than the positive control area, probably due to the presence of vegetal debris and garbage in the catch basins.

In conclusion, the vegetable oil-based larvicide was not effective in public area applications. For the public administration, its cost for application is higher than the traditional larvicide use. In private areas, its use is recommended, since it is safe for citizens, who can frequently apply it (weekly) in non-removable larval breeding sites. However, in 2022, the implementation of communication campaigns resulted in fewer mosquito numbers (meaning as eggs/ovitraps) in the treated area than in the control.

This work was carried out in the frame of the National CCM Project "Preventing vector-borne diseases through the development and pilot implementation of new operational supporting tools".