

Update on wetland mosquito fauna in southern Switzerland (Ticino)

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Background

Due to the climatic and geographic situation of Canton Ticino, located south of the Alps in Switzerland, this region is particularly interesting for studying the diversity of mosquito fauna. Due to repeated nuisance for residents and tourists, mosquito control programs are in place since the 1980s in some areas (e.g. regular treatments against floodwater mosquitoes in the Bolle di Magadino). The goal of this study was to update knowledge about wetland mosquito fauna (Diptera: Culicidae) in two nature reserves in Canton Ticino and to check for potential disturbance for nearby residents.

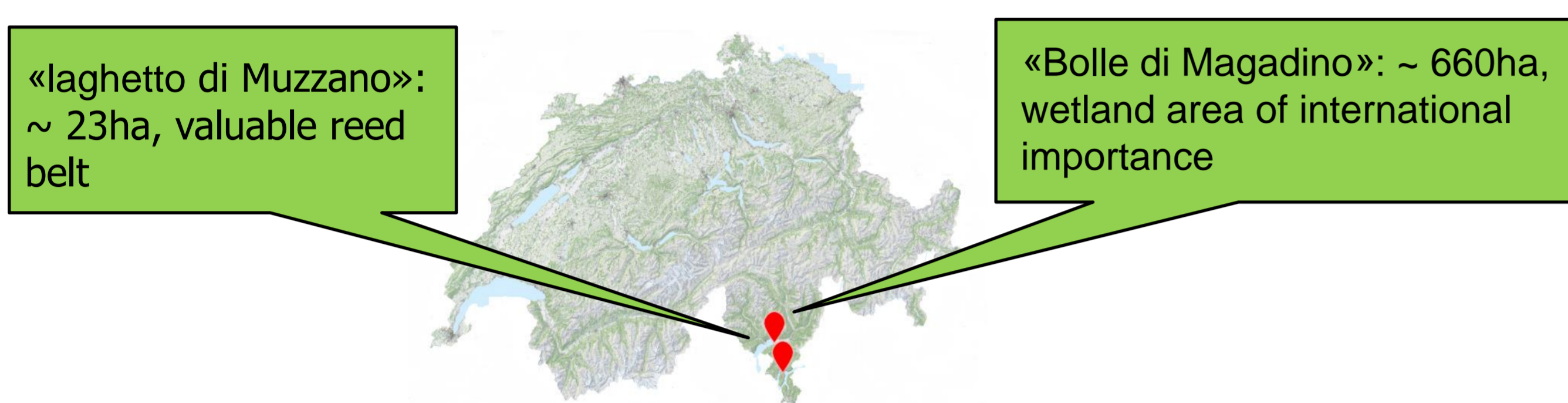


Fig.1 Map of Switzerland with the 2 study areas

Material & Methods

Mosquitoes were sampled monthly between June and September 2018, both within the protected areas as well as in adjacent urban areas. Centers for Disease Control (CDC) miniature light traps were used to collect adults. Larval stages were sampled using a standard pint dipper. Larvae and adult stages were collected at 27 different sampling sites (12 at laghetto di Muzzano, 15 at Bolle di Magadino). Mosquitoes were identified to the species level using morphological keys.



Fig.2 Mounting of CDC trap.

Results

A total of 20'406 mosquitoes (both juvenile and adult stages) were collected at 27 sampling sites during 5 sampling rounds.

High species diversity in the nature reserves

A wide range of species was detected in the nature reserves, which is in line with earlier studies in the same areas (Flacio et al. 2014). At the laghetto di Muzzano, where 13 different species were recorded, the ubiquitous species *Cx. pipiens/torrentium* as well as *Cq. richiardii* and the associated species *Cq. buxtoni* dominated (Fig. 3). At the Bolle di Magadino, where typical floodwater mosquitoes prevail, an equally rich diversity of species with 17 different species was caught (Fig. 4).

Comparing with earlier studies at the «Bolle», the study of 2018 shows that while *Ae. sticticus* is still the second most frequent species after *Ae. vexans*, in this year's study the ratio of these two species seems to have changed in favour of *Ae. vexans*. Also, *An. maculipennis* s.l. seems to have increased relatively, while *Ae. cantans* was caught less frequently.

Relatively few larvae could be sampled. At the Bolle di Magadino, where temporary water bodies were found up to July, 559 larvae were collected, mainly *Ae. vexans* and *Ae. cinereus/geminus* in May.

Hardly any impact on residential areas

Generally the impact on adjacent settlements was very low in 2018. At the laghetto di Muzzano, where settlements are located very closely to the reserve, in June and July *Coquillettidia* species (especially *Cq. richiardii*) were the most abundant species (Fig. 5). They have been described as a severe nuisance for humans and domestic animals (Becker et al. 2010). The reed belt around the lake is the typical breeding site for these species.

At the second protected area Bolle di Magadino no disturbance could be detected in the urban zone (Fig. 5). *Ae. caspius* was caught more often in residential areas than in the reserve. The highest number of adult mosquitoes outside the nature reserve was recorded at a farm, where cattle attracted mainly *Ae. vexans* and *An. maculipennis* s.l.. These results demonstrate that larval treatments in the nature reserve seem to be efficient in preventing nuisance.

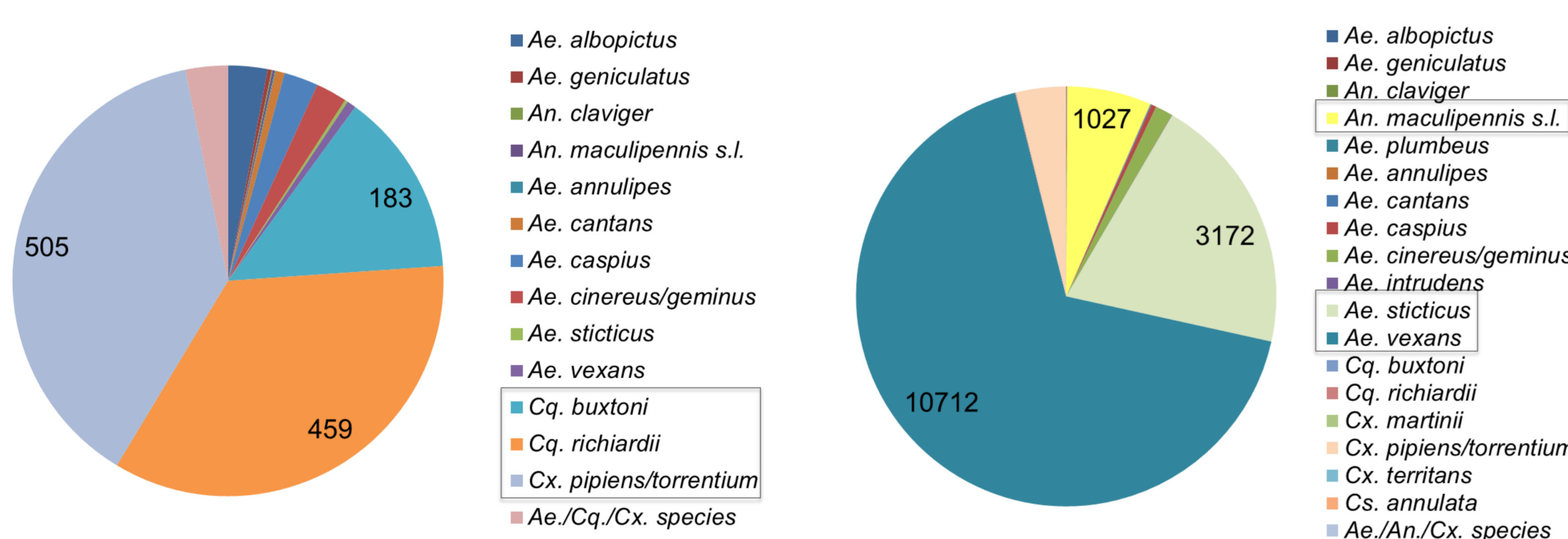


Fig.3 Proportion of adult mosquito species caught at the laghetto di Muzzano in 2018 (catch numbers given for 3 most abundant species).

Fig.4 Proportion of adult mosquito species caught at the Bolle di Magadino in 2018 (catch numbers given for 3 most abundant species).

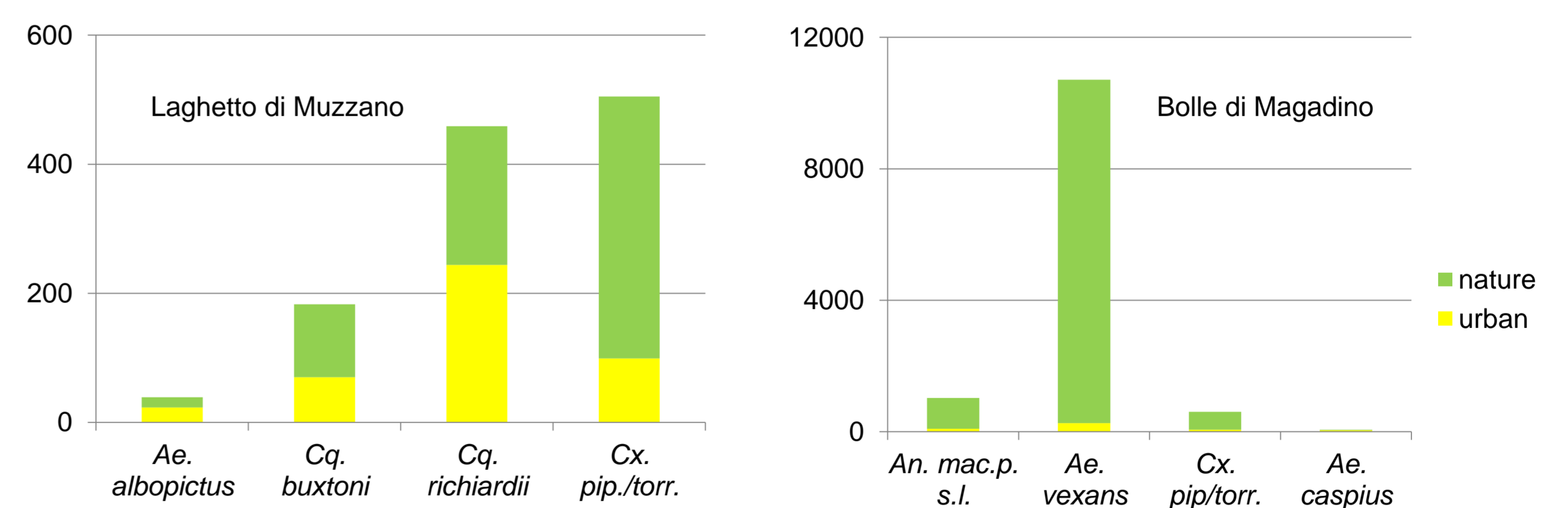


Fig.5 The 4 most abundant adult species caught in urban zones (yellow). In green are the corresponding numbers caught in the nature reserve.

Conclusion

The results show that there is a rich and stable mosquito species diversity at the nature reserves. At the laghetto di Muzzano the reserve and the nearby urban areas are largely dominated by *Coquillettidia* species. Due to their development, treatments against are difficult to implement. If they are necessary, new approaches to control should be discussed. No nuisance for residents near the Bolle di Magadino was detected.

- ✓ Rich and stable diversity of species in nature reserves
- ✓ Hardly any impact on residents

References:

- Becker, N., Petrič, D., Zgomba, M., Boase, C., Madon, M., Dahl, C. & Kaiser, A. 2010. Mosquitoes and their control. – Springer, Heidelberg. 577p.
 Flacio, E., Rossi-Pedruzzi A., Bernasconi-Casati E. & Patocchi N. 2014. Culicidae fauna from Canton Ticino and report of three new species for Switzerland. – Mitteilungen der Schweizerischen Entomologischen Gesellschaft 87:163 – 82.
 Map: map.geo.admin.ch Photo: N. Patocchi

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