XI International Conference
European Mosquito Control Association
7-10 November 2023, Palma, Spain
SHAPING THE FUTURE OF VECTOR CONTROL IN EUROPE

Distribution and spreading of invasive mosquito *Aedes japonicus japonicus* and *Aedes koreicus* in Italy

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INTRODUCTION

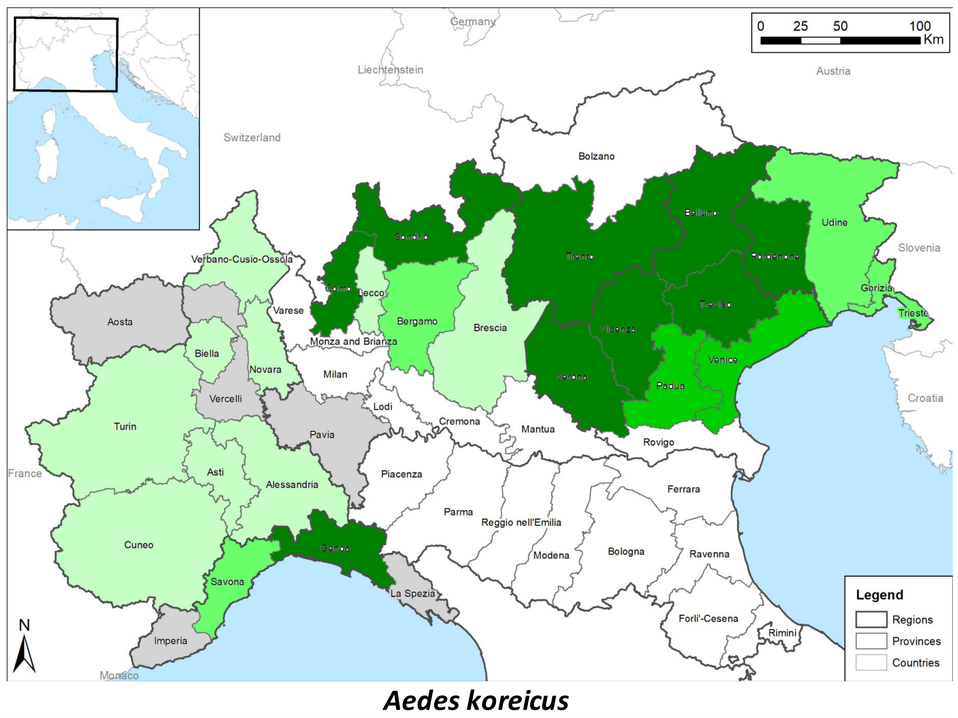
In this study we report data on the occurrence and spread of *Aedes koreicus* and *Aedes j. japonicus* in Italy from 2011 to 2022. Mosquitoes were collected in the frame of different projects by larval search, traps for adult mosquito and ovitraps.

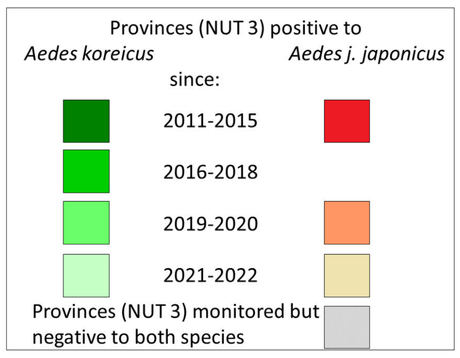
MATERIALS AND METHODS

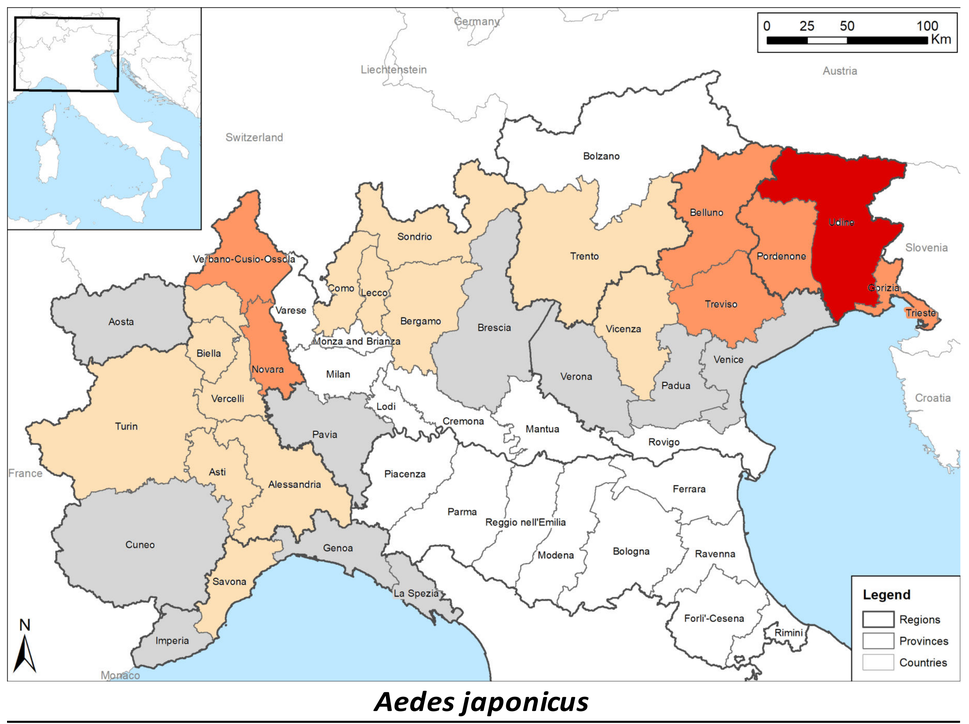
Sites and municipalities were considered positive if larvae, adults or eggs (larval identification after hatching) were found. *Aedes albopictus* was not considered because this species is present all over Italy.

RESULTS

During the last 12 years of entomological surveillance, 1703 municipalities of 7 Italian Regions (the whole of Northern Italy) were monitored. *Aedes koreicus* occurs in 456 municipalities (26.8%) and *Ae. j. japonicus* in 210 (12.3%).







Aedes koreicus

Region	2011-2015	2016-2018	2019-2020	2021-2022
Friuli Venezia Giulia	4/12 (33%)	0/62 (0%)	32/94 (34%)	8/27 (30%)
Veneto	66/107 (62%)	66/103 (64%)	99/152 (65%)	77/94 (82%)
Lombardy	2/10 (20%)	-	1/1 (100%)	20/38 (53%)
Trentino	12/29 (41%)	22/41 (54%)	12/13 (92%)	12/14 (86%)
Piedmont	-	0/199 (0%)	0/303 (0%)	15/349 (4%)
Liguria	1/1 (100%)	2/17 (12%)	3/15 (20%)	2/14 (14%)
Aosta valley	-	0/3 (0%)	-	0/5 (0%)

Number of municipalities positive/monitored (and percentage) to Aedes koreicus.

Aedes japonicus

Region	2011-2015	2016-2018	2019-2020	2021-2022
Friuli Venezia Giulia	1/12 (8%)	50/62 (81%)	66/94 (70%)	25/27 (93%)
Veneto	0/107 (0%)	0/103 (0%)	20/152 (13%)	8/94 (8%)
Lombardy	0/10 (0%)	-	0/1 (0%)	9/38 (24%)
Trentino	0/13 (0%)	0/41 (0%)	0/13 (0%)	4/14 (29%)
Piedmont	-	0/199 (0%)	10/303 (3%)	15/349 (4%)
Liguria	-	0/17 (0%)	0/15 (0%)	2/14 (14%)
Aosta valley	-	0/3 (0%)	-	0/5 (0%)

Number of municipalities positive/monitored (and percentage) to Aedes j. japonicus.

Aedes koreicus

After its first finding in 2011 in Veneto Region, *Ae. koreicus* spread throughout northeast in five years; it was also found in Lombardy at Italian Swiss border. A probably new introduction was recorded in Liguria region (Northwest Italy) in 2015.

Aedes j. japonicus

It was found in 2015 in a municipality bordering Austria and it has spread to Northwest, reaching the bordering region (Veneto region) in 2019. To date, *Ae. j. japonicus* spreads slower than *Ae. koreicus.*

DISCUSSION

The expansion of both species southwards is likely limited by high summer temperatures and by the high density of the competitor species *Ae. albopictus* in the plain area. The overlapping of *Ae. koreicus*, *Ae. j. japonicus* and *Ae. albopictus* distribution is complicating the entomological monitoring system, due to their similar biology and morphology. Therefore, long-term surveillance and early detection are needed to limit the further spread and plan control actions against these invasive mosquitoes.

Acknowledgments

This work was funded by Veneto, Friuli Venezia Giulia, Piedmont Regions and the autonomous province of Trento.

Finanziato dall'Unione europea NextGenerationEU
Ministero dell'Università e della Ricerca
Italiadomani PIANO NAZIONALE DI RIPRESA E RESILIENZA
Fondazione INF-ACT