

1 **Lessons learned exploiting a multi-year large-scale dataset derived from operational quality**  
2 **assessment of mosquito larval treatments in rain catch basins**

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4 Chiara Virgillito<sup>1</sup>, Eleonora Longo<sup>1,2</sup>, Silvia Paolucci<sup>1</sup>, Martina Micocci<sup>1</sup>, Mattia Manica<sup>3</sup>, Federico Filipponi<sup>4</sup>, Stefano Vettore<sup>5</sup>,  
5 Davide Bonetto<sup>5</sup>, Andrea Drago<sup>5</sup>, Simone Martini<sup>5</sup>, Alessandra della Torre<sup>1</sup>, Beniamino Caputo<sup>1\*</sup>

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7 <sup>1</sup> -Department of Public Health and Infectious Diseases, Sapienza Università di Roma, Roma, Italy

8 <sup>2</sup>- Center Agriculture Food Environment, University of Trento, San Michele all'Adige (TN), Italy

9 <sup>3</sup> -Center for Health Emergencies, Fondazione Bruno Kessler, Trento, Italy

10 <sup>4</sup>- National Research Council – Institute for Environmental Geology and Geoengineering (CNR-IGAG), Montelibretti (RM), Italy

11 <sup>5</sup> . Entostudio srl, Ponte San Nicolò (PD), Italy

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13 \*Corresponding author: [beniamino.caputo@uniroma1.it](mailto:beniamino.caputo@uniroma1.it)

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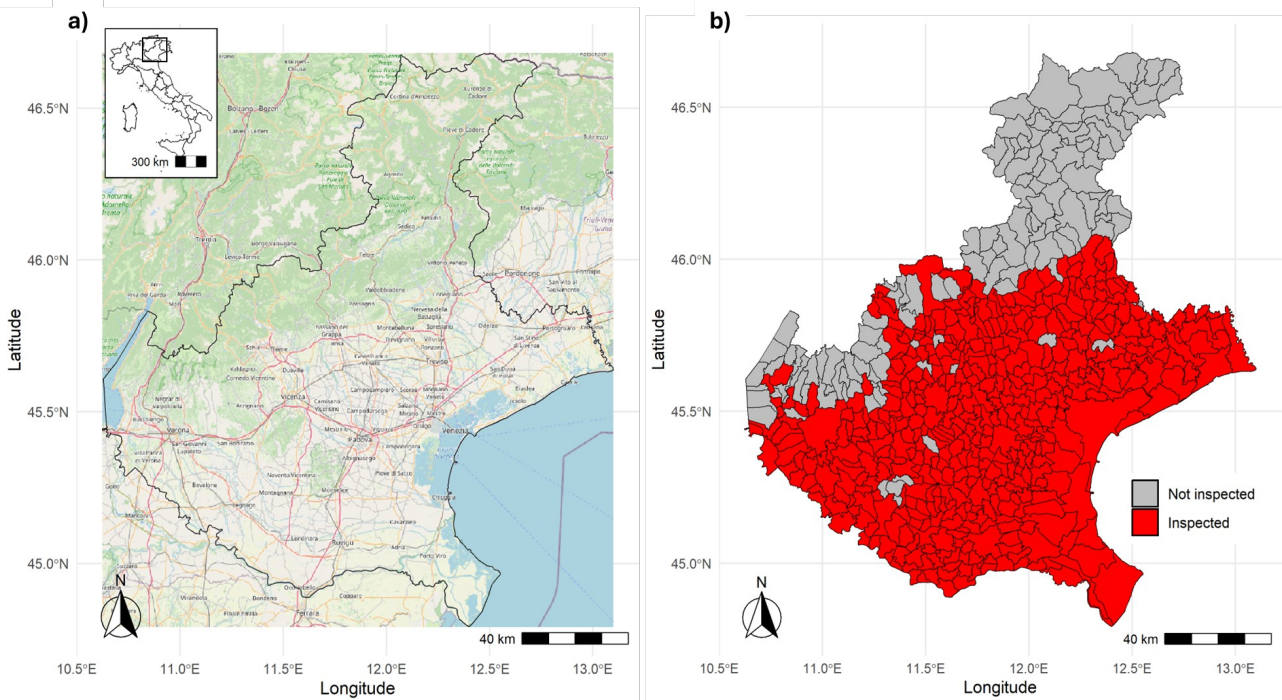
15 **Short Running Title**

16 Lesson learned from mosquito larval control

17 **Keywords:** larvicide, mosquito, quality control, catch basins

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19 **Figure S1:** Sampling area. a) Topographic map of Veneto region; b) Municipalities where at least one catch basin were  
20 inspected in 2019, 2020 and 2021 (red).



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24 **Table S1:** The 461 municipalities of the Veneto region inspected each year.

Municipalities	Catch basin inspections		
	2019	2020	2021
Abano Terme	yes	yes	no
Adria	yes	yes	yes
Agna	yes	yes	yes
Agugliaro	yes	yes	yes
Albaredo d'Adige	yes	no	no
Albettono	no	yes	yes
Albignasego	yes	yes	yes
Alonte	yes	yes	yes
Altavilla Vicentina	yes	yes	yes
Altivole	yes	no	yes
Angiari	yes	yes	yes
Anguillara Veneta	yes	yes	yes
Annone Veneto	yes	no	no
Arcade	no	yes	yes
Arcole	no	no	yes
Arcugnano	yes	yes	no
Ariano nel Polesine	yes	yes	no
Arqua Petrarca	yes	yes	yes
Arqua Polesine	yes	yes	no
Arre	yes	yes	yes
Arsiero	yes	yes	yes
Arzergrande	yes	yes	yes
Arzignano	yes	yes	yes
Asiago	no	yes	no
Asigliano Veneto	yes	yes	no
Asolo	yes	yes	yes
Badia Polesine	yes	yes	no
Bagnoli di Sopra	yes	no	no
Bagnolo di Po	yes	yes	yes
Baone	yes	yes	yes
Barbarano Mossano	yes	yes	yes
Barbona	yes	yes	yes
Bassano del Grappa	yes	yes	yes
Battaglia Terme	yes	yes	yes
Belfiore	yes	yes	yes
Bergantino	yes	yes	yes
Bevilacqua	no	yes	yes
Boara Pisani	yes	yes	no
Bolzano Vicentino	yes	yes	yes
Borgo Veneto	no	yes	yes
Borgoricco	yes	yes	yes
Borso del Grappa	yes	no	no
Bosaro	yes	yes	no
Bovolenta	yes	yes	yes

Bovolone	yes	yes	yes
Breganze	yes	yes	no
Brendola	yes	no	yes
Brogliano	no	yes	yes
Brugine	yes	yes	yes
Bussolengo	yes	yes	yes
Buttapietra	yes	no	yes
Cadoneghe	yes	yes	yes
Caerano di San Marco	yes	yes	no
Caldiero	no	yes	yes
Caldogno	yes	yes	yes
Calto	yes	yes	yes
Caltrano	yes	yes	yes
Calvene	no	no	yes
Camisano Vicentino	no	yes	yes
Campagna Lupia	yes	yes	yes
Campiglia dei Berici	yes	yes	yes
Campo San Martino	yes	yes	yes
Campodarsego	yes	yes	yes
Campodoro	yes	yes	yes
Campolongo Maggiore	yes	yes	yes
Campolongo sul Brenta	yes	no	no
Camponogara	yes	yes	yes
Camposampiero	yes	yes	yes
Canaro	yes	yes	yes
Canda	yes	yes	no
Candiana	yes	yes	yes
Caorle	yes	no	no
Cappella Maggiore	no	no	yes
Caprino Veronese	no	yes	no
Carbonera	yes	no	yes
Carceri	yes	yes	yes
Carmignano di Brenta	yes	yes	yes
Carre	no	no	yes
Cartigliano	yes	yes	yes
Cartura	yes	yes	yes
Casale di Scodosia	no	yes	yes
Casale sul Sile	yes	yes	no
Casaleone	yes	yes	yes
Casalserugo	yes	yes	yes
Casier	yes	yes	yes
Cassola	yes	yes	yes
Castagnaro	yes	no	no
Castegnero	yes	yes	yes
Castel d'Azzano	yes	no	yes
Castelbaldo	yes	yes	yes
Castelcucco	yes	yes	yes

Castelfranco Veneto	yes	no	no
Castelgomberto	yes	no	yes
Castelguglielmo	yes	no	yes
Castello di Godego	yes	no	yes
Castelmassa	yes	yes	yes
Castelnovo Bariano	yes	yes	no
Castelnuovo del Garda	yes	yes	yes
Cavaion Veronese	no	yes	no
Cavallino-Treporti	yes	no	no
Cavarzere	yes	yes	yes
Cavaso del Tomba	no	no	yes
Cazzano di Tramigna	no	yes	yes
Ceggia	yes	no	no
Ceneselli	yes	yes	yes
Cerea	yes	no	yes
Ceregnano	yes	yes	yes
Cervarese Santa Croce	yes	yes	yes
Cessalto	yes	yes	yes
Chiarano	yes	yes	yes
Chioggia	yes	yes	yes
Chiuppano	no	yes	no
Cimadolmo	yes	yes	no
Cinto Caomaggiore	yes	no	no
Cinto Euganeo	yes	yes	yes
Cismon del Grappa	yes	no	no
Cison di Valmarino	no	no	yes
Cittadella	yes	yes	yes
Codevigo	no	yes	yes
Codogne	no	no	yes
Codogno	no	yes	no
Colceresa	no	yes	yes
Colle Umberto	yes	yes	no
Cologna Veneta	yes	no	no
Colognola ai Colli	yes	no	yes
Cona	yes	yes	yes
Concamarise	yes	yes	yes
Concordia Sagittaria	yes	no	no
Conegliano	yes	no	yes
Conselve	yes	yes	yes
Corbola	yes	yes	yes
Cordignano	yes	yes	yes
Cornedo Vicentino	yes	no	yes
Cornuda	yes	no	no
Correzzola	yes	yes	yes
Costa di Rovigo	yes	yes	no
Costabissara	no	yes	yes
Costermano	no	yes	no

Creazzo	yes	yes	yes
Crespano del Grappa	yes	no	no
Crespino	yes	yes	no
Crocetta del Montello	no	yes	no
Curtarolo	yes	no	yes
Dolo	yes	yes	yes
Due Carrare	yes	yes	yes
Dueville	yes	yes	yes
Enego	no	yes	no
Eraclea	yes	no	no
Erbe	yes	yes	yes
Este	yes	yes	yes
Farra di Soligo	no	yes	yes
Ficarolo	yes	yes	no
Fiesso Umbertiano	yes	no	yes
Fiesso d'Artico	yes	yes	yes
Fontanelle	yes	yes	yes
Fontaniva	yes	yes	yes
Fonte	yes	yes	yes
Fossalta di Piave	yes	no	no
Fossalta di Portogruaro	yes	no	no
Fosso	yes	yes	yes
Frassinelle Polesine	yes	yes	yes
Fratta Polesine	yes	no	no
Fregona	no	yes	yes
Gaiarine	no	yes	no
Gaiba	yes	yes	yes
Galliera Veneta	yes	yes	yes
Galzignano Terme	yes	yes	yes
Gambellara	no	yes	no
Gambugliano	yes	yes	yes
Gavello	yes	yes	yes
Gazzo	yes	yes	yes
Gazzo Veronese	no	yes	yes
Giacciano con Baruchella	yes	yes	no
Giavera del Montello	yes	yes	yes
Godega di Sant'Urbano	no	yes	yes
Gorgo al Monticano	yes	yes	yes
Grantorto	yes	yes	yes
Granze	yes	yes	no
Grisignano di Zocco	yes	yes	yes
Gruaro	yes	no	no
Grumolo delle Abbadesse	yes	yes	yes
Guarda Veneta	yes	yes	yes
Illasi	yes	yes	no
Isola Rizza	yes	yes	yes
Isola Vicentina	yes	yes	yes

Isola della Scala	yes	yes	yes
Istrana	yes	yes	no
Jesolo	yes	no	no
Laghi	no	no	yes
Lastebasse	no	no	yes
Lavagno	yes	yes	yes
Legnago	no	no	yes
Legnaro	yes	no	yes
Lendinara	yes	no	yes
Limena	yes	yes	yes
Longare	yes	yes	yes
Lonigo	no	yes	yes
Loreggia	yes	yes	yes
Loreo	no	yes	no
Loria	no	yes	no
Lozzo Atestino	yes	yes	yes
Lugo di Vicenza	no	no	yes
Lusia	yes	yes	no
Lusiana Conco	no	yes	no
Malo	yes	yes	no
Mansue	no	yes	yes
Marano Vicentino	no	yes	no
Marcon	yes	yes	yes
Mareno di Piave	yes	yes	no
Marostica	yes	yes	no
Martellago	yes	yes	yes
Maser	yes	yes	yes
Masera di Padova	yes	no	yes
Maserada sul Piave	no	yes	yes
Masi	yes	yes	yes
Mason Vicentino	yes	no	no
Massanzago	yes	yes	yes
Meduna di Livenza	no	yes	no
Megliadino San Fidenzio	yes	no	no
Megliadino San Vitale	yes	yes	yes
Melara	yes	yes	no
Meolo	yes	no	no
Merlara	yes	yes	yes
Mestrino	yes	yes	yes
Mezzane di Sotto	no	yes	yes
Miane	yes	yes	yes
Mira	yes	yes	yes
Mirano	yes	yes	yes
Mogliano Veneto	yes	yes	yes
Molvena	yes	no	no
Monastier di Treviso	yes	yes	no
Monfumo	no	yes	yes

Monselice	yes	yes	yes
Montagnana	yes	yes	yes
Monte di Malo	no	yes	no
Montebello Vicentino	no	yes	yes
Montebelluna	yes	no	yes
Montecchia di Crosara	yes	no	yes
Montecchio Maggiore	yes	yes	yes
Montecchio Precalcino	yes	yes	yes
Monteforte d'Alpone	yes	yes	yes
Montegalda	yes	yes	yes
Montegaldella	yes	yes	yes
Montegrotto Terme	yes	yes	yes
Monteviale	yes	yes	yes
Monticello Conte Otto	no	yes	yes
Montorso Vicentino	no	yes	yes
Morgano	yes	yes	yes
Moriago della Battaglia	no	yes	yes
Motta di Livenza	yes	no	yes
Mozzecane	no	yes	no
Musile di Piave	yes	no	no
Mussolente	yes	yes	yes
Nanto	yes	yes	yes
Negrar	no	yes	no
Nervesa della Battaglia	no	yes	no
Noale	yes	yes	yes
Nogara	yes	yes	yes
Nogarole Rocca	yes	yes	yes
Nove	yes	yes	no
Noventa Padovana	yes	yes	yes
Noventa Vicentina	no	yes	no
Noventa di Piave	yes	no	no
Occhiobello	yes	yes	yes
Oderzo	yes	no	no
Oppeano	yes	yes	yes
Orgiano	yes	yes	yes
Ormelle	yes	yes	no
Orsago	no	yes	yes
Ospedaletto Euganeo	no	yes	yes
Paderno del Grappa	yes	no	no
Padova	yes	yes	yes
Paese	yes	yes	yes
Palu	yes	yes	yes
Papozze	yes	yes	yes
Pastrengo	yes	no	no
Pederobba	no	yes	no
Pernumia	yes	yes	yes
Peschiera del Garda	no	yes	no

Pettorazza Grimani	yes	yes	no
Piacenza d'Adige	yes	yes	yes
Pianezze	yes	yes	no
Pianiga	yes	yes	yes
Piazzola sul Brenta	yes	yes	yes
Pieve del Grappa	no	yes	yes
Pieve di Soligo	no	yes	yes
Pincara	yes	yes	yes
Piombino Dese	yes	yes	yes
Piove di Sacco	yes	yes	yes
Piovene Rocchette	yes	yes	no
Pojana Maggiore	yes	yes	no
Polesella	yes	yes	no
Polverara	yes	yes	no
Ponso	yes	yes	yes
Ponte San Nicolo	yes	yes	no
Ponte di Piave	no	yes	yes
Pontecchio Polesine	yes	yes	yes
Pontelongo	yes	yes	yes
Ponzano Veneto	yes	yes	no
Porto Tolle	yes	no	yes
Porto Viro	no	no	yes
Portogruaro	yes	no	no
Possagno	no	no	yes
Pove del Grappa	yes	yes	yes
Povegliano	yes	yes	no
Povegliano Veronese	yes	yes	no
Pozzoleone	yes	yes	yes
Pozzonovo	yes	yes	yes
Pramaggiore	yes	no	no
Preganziol	yes	yes	yes
Quarto d'Altino	yes	yes	yes
Quinto Vicentino	no	yes	yes
Quinto di Treviso	yes	yes	yes
Refrontolo	yes	yes	yes
Resana	yes	yes	yes
Revine Lago	no	yes	yes
Riese Pio X	yes	yes	yes
Romano d'Ezzelino	yes	yes	yes
Ronca	yes	yes	yes
Roncade	yes	no	yes
Ronco All'Adige	yes	yes	yes
Rosa	yes	yes	yes
Rosolina	yes	no	no
Rossano Veneto	yes	yes	yes
Roverchiara	yes	yes	yes
Roveredo di Guè	no	no	yes

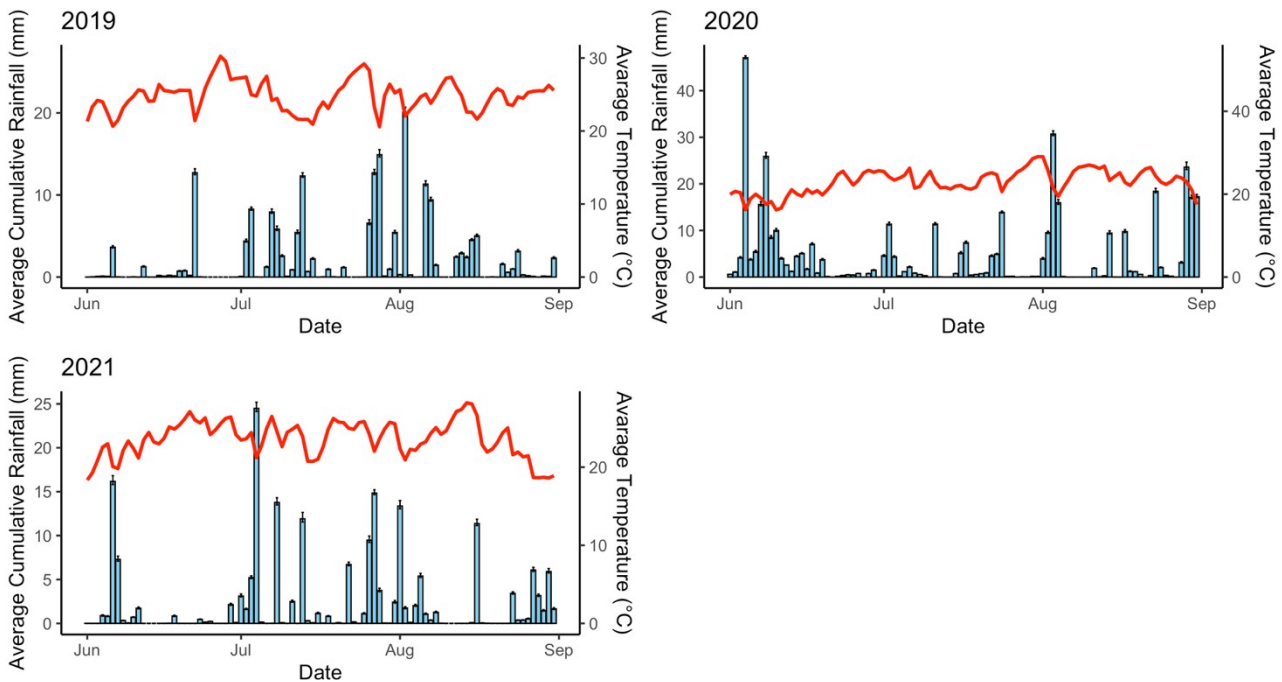
Rovigo	yes	yes	yes
Rovolon	yes	yes	yes
Rubano	yes	yes	yes
Saccolongo	yes	yes	yes
Salara	yes	yes	no
Salcedo	yes	no	yes
Saletto	yes	no	no
Salgareda	yes	no	no
Salizzole	yes	yes	yes
Salzano	yes	yes	yes
San Bellino	yes	yes	no
San Biagio di Callalta	no	no	yes
San Bonifacio	yes	no	no
San Dona di Piave	yes	no	no
San Fior	no	yes	yes
San Giorgio delle Pertiche	yes	yes	yes
San Giorgio in Bosco	yes	yes	yes
San Giovanni Lupatoto	no	yes	yes
San Martino Buon Albergo	yes	yes	no
San Martino di Lupari	yes	yes	yes
San Martino di Venezze	yes	yes	no
San Michele al Tagliamento	yes	no	no
San Nazario	yes	no	no
San Pietro Viminario	yes	yes	yes
San Pietro di Feletto	no	yes	yes
San Pietro di Morubio	yes	yes	yes
San Pietro in Cariano	no	no	yes
San Pietro in Guè	yes	yes	no
San Polo di Piave	yes	yes	no
San Stino di Livenza	yes	no	no
San Vendemiano	yes	no	no
San Vito di Leguzzano	no	yes	no
San Zenone degli Ezzelini	no	no	yes
Sandrigo	yes	yes	yes
Sanguinetto	no	no	yes
Sant'Ambrogio di Valpolicella	no	no	yes
Sant'Angelo di Piove di Sacco	yes	yes	yes
Sant'Elena	yes	yes	no
Sant'Urbano	yes	yes	yes
Santa Giustina in Colle	yes	yes	yes
Santa Lucia di Piave	no	yes	yes
Santa Margherita d'Adige	yes	no	no
Santa Maria di Sala	yes	yes	yes
Santorso	yes	yes	yes
Saonara	yes	yes	yes
Sarcedo	no	no	yes

Sarego	yes	yes	yes
Sarmede	yes	no	yes
Schiavon	no	yes	yes
Schio	yes	yes	yes
Scorza	no	yes	no
Scorze	yes	no	yes
Segusino	yes	no	yes
Selvazzano Dentro	yes	yes	no
Sernaglia della Battaglia	no	yes	yes
Silea	yes	yes	yes
Soave	yes	yes	yes
Solagna	yes	yes	yes
Solesino	yes	yes	no
Sommacampagna	yes	no	yes
Sona	yes	no	yes
Sorga	yes	yes	yes
Sossano	no	yes	yes
Sovizzo	yes	yes	yes
Spinea	yes	yes	yes
Spresiano	yes	yes	yes
Stanghella	yes	yes	yes
Stienta	yes	yes	yes
Stra	yes	yes	yes
Susegana	no	yes	no
Taglio di Po	yes	yes	yes
Tarzo	yes	yes	yes
Teglio Veneto	yes	no	no
Teolo	yes	yes	no
Terrassa Padovana	yes	yes	yes
Terrazzo	yes	no	yes
Tezze sul Brenta	yes	no	yes
Thiene	yes	no	no
Tombolo	no	yes	yes
Tonezza del Cimone	no	no	yes
Torre di Mosto	yes	no	no
Torreglia	yes	yes	yes
Torri di Quartesolo	no	yes	no
Trebaseleghe	yes	yes	yes
Trecenta	yes	yes	yes
Tregnago	yes	no	no
Trevenzuolo	yes	yes	yes
Treviso	yes	yes	yes
Tribano	yes	no	yes
Trissino	yes	yes	yes
Urbana	yes	yes	yes
Val Liona	yes	yes	yes
Valbrenta	no	yes	no

Valdobbiadene	no	yes	yes
Valeggio sul Mincio	yes	yes	yes
Valstagna	yes	no	no
Vazzola	yes	yes	yes
Vedelago	yes	yes	yes
Veggiano	yes	yes	no
Velo d'Astico	no	yes	no
Venezia	yes	yes	yes
Verona	yes	yes	yes
Veronella	yes	yes	yes
Vescovana	yes	yes	yes
Vestenanova	no	yes	no
Vicenza	yes	yes	yes
Vidor	no	yes	yes
Vigasio	yes	yes	yes
Vighizzolo d'Este	no	yes	yes
Vigodarzere	yes	yes	no
Vigonovo	yes	yes	yes
Vigonza	yes	yes	yes
Villa Bartolomea	yes	no	no
Villa Estense	yes	no	yes
Villa del Conte	yes	yes	yes
Villadose	yes	yes	no
Villafranca Padovana	yes	yes	yes
Villafranca di Verona	yes	no	yes
Villamarzana	yes	yes	yes
Villanova Marchesana	yes	yes	no
Villanova del Ghebbo	yes	yes	no
Villanova di Camposampiero	yes	yes	yes
Villorba	yes	yes	yes
Vittorio Veneto	no	yes	yes
Vo	yes	yes	yes
Volpago del Montello	yes	no	no
Zenson di Piave	yes	yes	no
Zermeghedo	no	yes	yes
Zero Branco	yes	no	no
Zevio	yes	yes	yes
Zimella	yes	yes	yes
Zovencedo	yes	no	no
Zugliano	no	no	yes

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33 **Figure S2: Average Temperature (red, right y-axis) and Cumulative Rainfall (blue, left y-axis) in the municipalities**  
 34 **inspected during the study period (June-August 2019-2021).** Vertical lines= 95% confidence interval for Cumulative  
 35 Rainfall.  
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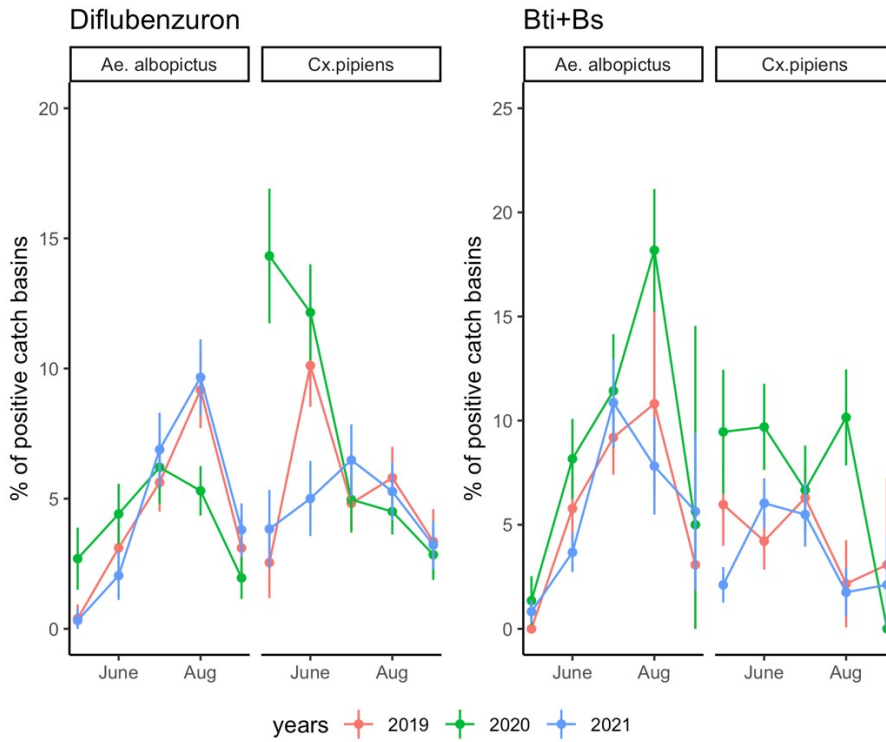
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 38 **Table S2: Characteristics of all catch basins inspected in 2019, 2020 and 2021.** \*= calculated using dry and non-dry  
 39 catch basins. \*\*= calculated using non-dry catch basins. DFB= Diflubenzuron; Bti= *Bacillus thuringiensis israelensis*;  
 40 Bs= *Bacillus sphaericus*

	2019 (N=13,852)	2020 (N=13,162)	2021 (N=12,827)
<b>Dry catch basins</b>	15% (N=2,086)	17% (N=2,241)	1% (N=129)
<b>No declaration of larval product*</b>	12.5% (N=1,735)	1.8% (N=233)	12.4% (N=1,590)
<b>Municipalities (N=560)</b>	64.8% (N=363)	63% (N=353)	57.7% (N=323)
<b>Products</b>			
-Dimethicone	NA	>1% (N=29)	>1% (N=32)
-DFB	54.3% (N=7,524)	66.7% (N=8,781)	47.7% (N=6,121)
-Bti+Bsh	24.3% (N=3,371)	26.6% (N=3,502)	34.8% (N=4,471)
-Pyriproxyfen	>1% (N=75)	2.4% (N=319)	1.9% (N=243)
-S-Metoprene	>1% (N=31)	>1% (N=48)	>1% (N=28)
- DFB + Bti+Bsh	4.4% (N=611)	1.6% (N=210)	2.7% (N=342)
- DFB + Pyriproxyfen	>1% (N=64)	>1% (N=40)	NA
- DFB + Bti	>1% (N=91)	NA	NA
- DFB + Bti + Bti+Bsh	2.3% (N=321)	NA	NA
-Bti + Bti+Bsh	>1% (N=29)	NA	NA
<b>Companies</b>	NA	38	46
<b>Catch basins positive for mosquitoes** (N 2019 = 11,766; N 2020 = 10,921; N 2021 = 12,698)</b>	9.8% (N=1,152)	12.9% (N=1,407)	9.1% (N=1,158)
Catch basins positive for <i>Ae. albopictus</i> **	5.9% (N=693)	7.7% (N=842)	5.2% (N=663)
Catch basins positive for <i>Cx. pipiens</i> **	6.6% (N=780)	8.5% (N=930)	5.4% (N=683)
<b>Days between treatment</b>	10	12	10

and verification  
(median)\*\*

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**Figure S3: Observed percentage of catch basins containing live mosquito L3-L4 larvae and pupae in months of collections in 2019, 2020 and 2021** x-axis=months of inspection; y-axis=Percentage of positive DFB-catch basins for *Ae. albopictus* and *Cx. pipiens* (Left) and positive Bti+Bsh -catch basins (Right) in the three years (red=2019; green=2020 and blue=2021). Vertical lines=95% CI of the mean percentage of positive inspected catch basins for each larvicide, years and species.



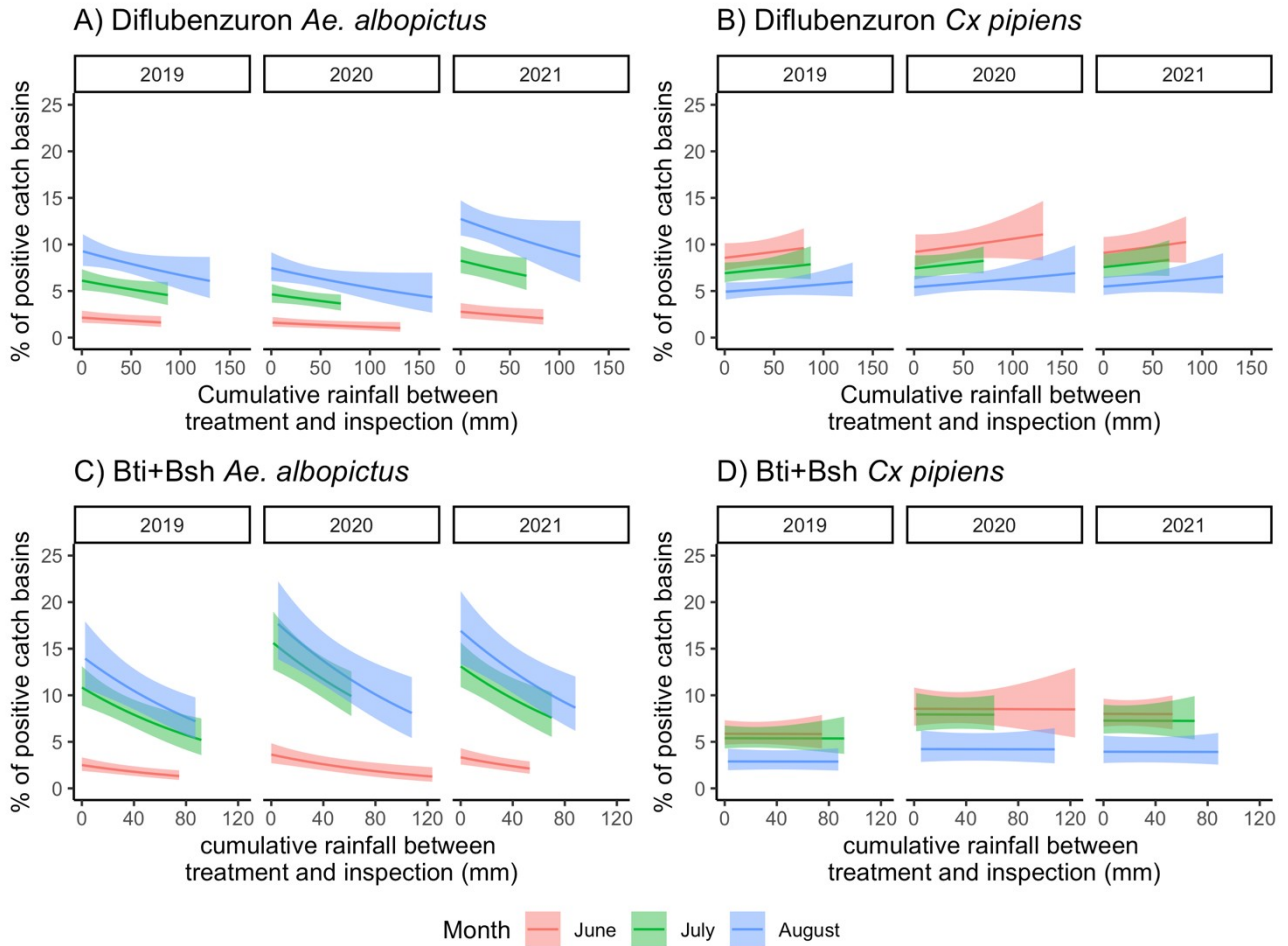
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54 **Table S3:** Summary of *Ae. albopictus* (GLM-1) and *Cx pipiens* (GLM-2) on catch basins with DFB verified between 7 and  
 55 21 days after treatment—baseline on intercept=June/2019. \* DTI = Days elapsed between treatment and inspection. \*\*=  
 56 Cumulative rainfall between treatment and inspection. GLM-1 R<sup>2</sup> =0.04 ; GLM-2 R<sup>2</sup> =0.07

<b>Response variables</b>	<b>Coefficient</b>	<b>Estimate</b>	<b>Std. Error</b>	<b>z value</b>	<b>Pr(&gt; z )</b>
<i>Ae. albopictus</i>	Intercept	-3.141	0.195741	-16.051	< 2e <sup>-16</sup>
	DTI*	-0.060979	0.013203	-4.618	3.87e-06
	July	1.121	0.154103	7.277	3.41e-13
	August	1.555	0.148744	10.457	< 2e <sup>-16</sup>
	CRF**	-0.003530	0.001894	-1.864	0.06232
	2020	-0.253968	0.099833	-2.544	0.01096
	2021	0.281777	0.096988	2.905	0.00367
<i>Cx. pipiens</i>	Intercept	-2.014	0.145682	-13.830	< 2e <sup>-16</sup>
	DTI*	-0.031790	0.011843	-2.684	0.00727
	July	-0.214582	0.090712	-2.366	0.01800
	August	-0.585985	0.093681	-6.255	3.97e <sup>-10</sup>
	CRF**	0.001590	0.001521	1.045	0.29602
	2020	0.095306	0.086067	1.107	0.26815
	2021	0.075331	0.096020	0.785	0.43273

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59 **Figure S4: Relationship between the percentage of catch basins containing live mosquito L3-L4 larvae and pupae**  
 60 **and the cumulative rainfall between treatment and inspection in 2019, 2020 and 2021.** A-B: Estimated percent of  
 61 DFB-catch basins positive to *Ae. albopictus* (GLM-1) and *Cx pipiens* (GLM-2) as a function of cumulative rainfall  
 62 between treatment and inspection in 2019, 2020 and 2021 (solid lines). C-D: Estimated percentage of Bti+Bsh-catch basins  
 63 positive to *Ae. albopictus* (GLM-3) and *Cx pipiens* (GLM-4) as a function of cumulative rainfall between treatment and  
 64 inspection in 2019, 2020 and 2021 (solid lines). Dashed areas=95% of CI. Red=June, green=July, blue=August.  
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69 **Table S4:** Summary of sensitivity analysis when a subset of the database was considered (only DFB-catch basins where  
70 were present at least one instar larvae L1 and/or L2) for *Ae. albopictus* (GLM-1) and *Cx pipiens* (GLM-2) on catch basins  
71 with DFB inspected between 7 and 21 days after treatment—baseline on intercept=June/2019. \* DTI = Days elapsed  
72 between treatment and inspection. \*\*= Cumulative rainfall between treatment and verification.

Response variables	Coefficient	Estimate	Std. Error	z value	Pr(> z )
<i>Ae. albopictus</i>	Intercept	1.087	0.6481259	1.678	0.09336
	DTI*	-0.0800055	0.0389999	-2.051	<b>0.04023</b>
	July	0.1682389	0.5228034	0.322	0.74760
	August	0.1944260	0.4667816	0.417	0.67703
	CRF**	-0.0003593	0.0056716	-0.063	<b>0.94949</b>
	2020	0.6508191	0.2944900	2.210	0.02711
	2021	1.219	0.3643161	3.346	0.00082
<i>Cx. pipiens</i>	Intercept	1.792	0.369016	4.858	1.19e-06
	DTI*	-0.044949	0.029680	-1.514	0.130
	July	-0.333815	0.222939	-1.497	0.134
	August	-0.082208	0.225115	-0.365	0.715
	CRF**	-0.002847	0.003567	-0.798	0.425
	2020	-0.237609	0.209148	-1.136	0.256
	2021	-0.314254	0.239650	-1.311	0.190

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**Table S5:** Summary of sensitivity analysis at municipality level for *Ae. albopictus* (GLM-1) and *Cx pipiens* (GLM-2) on  
catch basins with DFB verified between 7 and 21 days after treatment—baseline on intercept=June/2019. \* DTI = Days  
elapsed between treatment and inspection. \*\*= Cumulative rainfall between treatment and verification.

Response variables	Coefficient	Estimate	Std. Error	z value	Pr(> z )
<i>Ae. albopictus</i>	Intercept	-3.521583	0.269065	-13.088	2,00E-16
	DTI *	-0.074533	0.018529	-4.022	5.76e-05
	July	0.989141	0.214360	4.614	3.94e-06
	August	1.639939	0.204273	8.028	9.89e-16
	CRF**	-0.010108	0.002859	-3.535	0.000407
	2020	-0.138574	0.134788	-1.028	0.303908
	2021	-0.118945	0.130530	-0.911	0.362164
<i>Cx. pipiens</i>	Intercept	-2.667497	0.205033	-13.010	2,00E-16
	DTI *	-0.036864	0.016894	-2.182	0.05910
	July	-0.058989	0.126215	-0.467	0.64023
	August	-0.614653	0.138209	-4.447	8.7e-06
	CRF**	-0.002267	0.002326	-0.975	0.32956
	2020	0.150495	0.120305	1.251	0.21095
	2021	-0.364520	0.138656	-2.629	0.00856

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81 **Table S6.** Summary of *Ae. albopictus* (GLM-3) and *Cx pipiens* (GLM-4) on catch basins with Bti+Bs inspected between 2  
 82 and 28 days after treatment—baseline on intercept=June/2019. \*DTI= Days elapsed between treatment and inspection.  
 83 \*\*= Cumulative rainfall between treatment and inspection. GLM-3 R<sup>2</sup> =0.06; GLM-4 R<sup>2</sup> =0.1

Response variables	Coefficient	Estimate	Std. Error	z value	Pr(> z )
<i>Ae. albopictus</i>	Intercept	-3.953	0.171717	-23.016	< 2e <sup>-16</sup>
	DTI*	0.033	0.009758	3.391	0.000695
	July	1.464	0.134659	10.874	< 2e <sup>-16</sup>
	August	1.649	0.152224	10.831	< 2e <sup>-16</sup>
	CRF**	-0.009	0.002515	-3.426	0.000612
	2020	0.390	0.122637	3.180	0.001472
	2021	-0.022	0.119526	-0.182	0.855618
<i>Cx. pipiens</i>	Intercept	-2.825	0.1517829	-18.613	< 2e-16
	DTI *	0.009	0.0106848	0.883	0.37744
	July	-0.122	0.1103821	-1.107	0.26835
	August	-0.837	0.1822079	-4.592	4.39e <sup>-06</sup>
	CRF**	-0.001	0.0023341	-0.252	0.80116
	2020	0.398	0.1334996	2.985	0.00284
	2021	0.048	0.1246544	0.389	0.69741

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 85 **Table S7:** Summary of sensitivity analysis when a subset of the database was considered (only Bti+Bs-catch basins  
 86 where were present at least one instar larvae L1 and/or L2) for *Ae. albopictus* (GLM-3) and *Cx pipiens* (GLM-4) on  
 87 catch basins with Bti+Bs inspected between 2 and 28 days after treatment—baseline on intercept=June/2019. \*DTI=  
 88 Days elapsed between treatment and inspection. \*\*= Cumulative rainfall between treatment and inspection.

Response variables	Coefficient	Estimate	Std. Error	z value	Pr(> z )
<i>Ae. albopictus</i>	Intercept	-0.895241	0.349118	-2.564	0.0103
	DTI*	0.012414	0.022050	-0.563	0.5735
	July	1.208091	0.251642	4.801	1.58e-06
	August	1.866373	0.296105	6.303	2.92e-10
	CRF**	-0.011982	0.005166	-2.320	0.0204
	2020	0.406483	0.256890	1.582	0.1136
	2021	-0.120042	0.273097	-0.440	0.6603
<i>Cx. pipiens</i>	Intercept	2.515202	0.388364	6.476	9.39e-11
	DTI *	0.060609	0.022845	-2.653	0.00798
	July	-1.506004	0.255882	-5.886	3.97e-09
	August	-2.213318	0.309866	-7.143	9.14e-13
	CRF**	-0.002913	0.004711	-0.618	0.53640
	2020	-0.894032	0.274521	-3.257	0.00113
	2021	-0.571895	0.284598	-2.009	0.04449

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91 **Table S8:** Summary of sensitivity analysis at municipality level for *Ae. albopictus* (GLM-3) and *Cx. pipiens* (GLM-4)  
 92 on catch basins with Bti+Bs inspected between 2 and 28 days after treatment—baseline on intercept=June/2019. \* =  
 93 Days elapsed between treatment and inspection. \*\*= Cumulative rainfall between treatment and inspection.

<b>Response variables</b>	<b>Coefficient</b>	<b>Estimate</b>	<b>Std. Error</b>	<b>z value</b>	<b>Pr(&gt; z )</b>
<i>Ae. albopictus</i>	Intercept	-3.983554	0.171106	-23.281	2,00E-16
	DTI *	0.034270	0.009913	3.457	0.000546
	July	1.476464	0.133782	11.036	2,00E-16
	August	1.680545	0.151450	11.096	2,00E-16
	CRF**	-0.008815	0.002523	-3.493	0.000477
	2020	0.395672	0.122021	3.243	0.001184
	2021	-0.009622	0.118852	-0.081	0.935474
<i>Cx. pipiens</i>	Intercept	-2.8636419	0.1511334	-18.948	2,00E-16
	DTI *	0.0092711	0.0107815	0.860	0.38984
	July	-0.1106357	0.1098760	-1.007	0.31398
	August	-0.8002400	0.1802801	-4.439	9.04e-06
	CRF**	-0.0001602	0.0023257	-0.069	0.94507
	2020	0.4091951	0.1327842	3.082	0.00206
	2021	0.0705193	0.1234513	0.571	0.56784

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97 **Figure S5: Distribution of Cumulative Rainfall between DFB vs Bti+Bs treatment and inspection.** T-student test  
98 implemented considering the same time window for both treatment (i.e. 7-day/21-day) reveals no statistical difference  
99 between the two treatments ( $t = -0.613$ ;  $df=9378.6$ ,  $p\text{-value}=0.539$ ). The upper and lower whisker extends to the highest  
100 and lowest values within  $1.5 \times$  inter-quartile range, respectively. Black dots = outliers, black line= median, the top of the  
101 box = first quartile (25<sup>th</sup> percentile), the bottom of the box = third quartile (75<sup>th</sup> percentile).  
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