

Evaluation of the efficacy of Aquatain against *Culex pipiens* and *Aedes albopictus* larvae in catch basins using the Floating Monitor System

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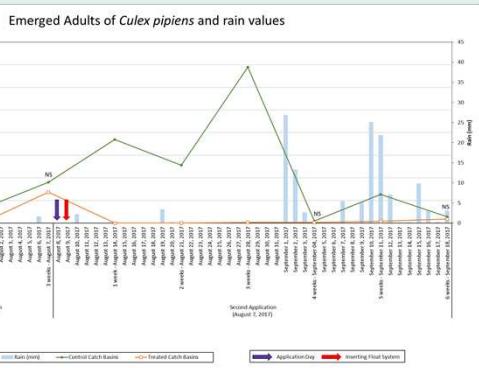
Introduction

Aedes albopictus and *Culex pipiens* are commonly distributed in Italy and represent the main species found in catch basins. The application of a silicon-based film product like Aquatain is a new tool recently introduced for catch basins treatment.

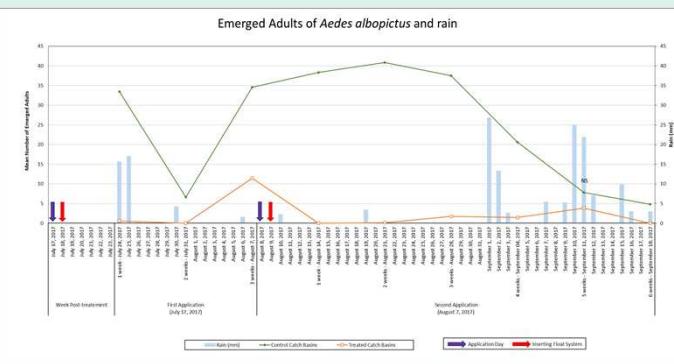
The particular way of action of Aquatain makes the monitoring of larvae by dipping a not appropriate approach to evaluate its efficacy. As laboratory studies showed, the larval hypoxia caused by Aquatain makes larvae die or lay on the bottom.

When samples of water are kept from the catch basins treated with Aquatain, larvae can be collected but it doesn't mean they will develop in adult as the hypoxia could kill them before the conclusion of the development cycle. If larvae are not present in the samples, it doesn't mean there are no larvae in the catch basins because they lay on the bottom and therefore cannot be collected.

The more realistic way to evaluate the efficacy of a product like Aquatain is to monitor the emerging adults but at the same time to permit wild mosquitoes to lay eggs: that's because the floating system was invented. This device permits the larvae to move completely free, while adults can emerge inside or outside the float. The floating monitor system permits to follow the changes in water level, which can decrease because of evaporation or increase because of rain.



Graph 1: mean number of emerged adults for *Culex pipiens*.



Graph 2: mean number of emerged adults for *Aedes albopictus*.

YEAR 2017	First Application			Second application					
	July 24	July 31	Aug. 07	Aug. 14	Aug. 21	Aug. 28	Sept. 04	Sept. 11	Sept. 18
Weeks post-treatment	1	2	3	1	2	3	4	5	6
IE% <i>Culex pipiens</i>	98.93	100.00	24.46	100.00	100.00	99.54	71.25	93.68	38.24

Tab. 1: Percentage of Inhibition of Emergence (IE%) for *Culex pipiens*.

YEAR 2017	First Application			Second application					
	July 24	July 31	Aug. 07	Aug. 14	Aug. 21	Aug. 28	Sept. 04	Sept. 11	Sept. 18
Weeks post-treatment	1	2	3	1	2	3	4	5	6
IE% <i>Aedes albopictus</i>	98.26	100.00	66.83	100.00	99.61	95.21	92.92	48.94	100.00

Tab. 2: Percentage of Inhibition of Emergence (IE%) for *Aedes albopictus*.

Materials and methods

The test was carried out in catch basins located in the town of Legnaro (PD) in North East Italy, in a residential area where there are many single houses with gardens and various public parks.

Two applications both of 2 ml/catch basin were done: the first on July 17th, 2017 and the second on August 7th, 2017. The test was performed applying the product in 25 catch basins. Other 25 catch basins were monitored as negative control.

The capability of the larvae to emerge as adults was measured using a floating system called Floating Monitor System (FMS).

When adult mosquitoes emerge into the FMS, they very soon stuck on the sticky surface (pictures 1, 2 and 3).

Results

Culex pipiens: In the 1st application the number of adults caught in the control replications decreased after two weeks, probably because of the heavy rains, so the product was re-applied.

After the 2nd application, the effectiveness is evident until three weeks; then from the fourth week the intense showers reduced the number of adults collected in control catch basins. No significant differences are present in the third sampling of the first application (Percentage of Inhibition - IE% = 24.46%) and in the fourth and sixth sampling of the second application (where IE% was, respectively, 71.25% and 38.24%).

Aedes albopictus: For 1st application, adults collected seem to be affected by the rain. At the 2nd application the number of adults emerged in control catch basins stays higher respect to treated catch basins till the fifth week, then the showers reduced the population in the control catch basins. No significant differences emerged in the fifth sampling of the second application (Percentage of Inhibition of Emergence = 48.94%).



COMPOSITION

- Polydimethylsiloxane 89.00 g
- Coformulants 11.00 g



Picture 1



Picture 2



Picture 3

Conclusions

The efficacy of the product seems to be affected by heavy rains that influence the persistence of Aquatain (see the graph n.1 and n.2). The 2017 summer was highly hot but few intense showers were recorded during the test.

The 1st application could be considered invalid because of the rains. The data collected during the 2nd application show how there was no reduction of efficacy because of the rain.

The non significative differences between control and treated catch basins, were due to the reduction of the emerged adults in the control and not because of the increasing of adults emerged from the treated catch basins.

What can be clearly said is that if it doesn't rain, Aquatain stays effective for at least 4 weeks. In case of heavy rains a monitoring activity is required to evaluate the need of a re-application.