

WORLDWIDE INVASION OF *Aedes albopictus*: THE SITUATION IN PIEDMONT

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Introduction

During the last decades, the increasing of transports and international exchanges allowed to a lot of organism to colonize new areas. Among them, a mosquito species, *Aedes albopictus*, known as Asian tiger mosquito, began to spread all over the world (Reiter, 1998).

Since the middle of the eighties, the international trade of used tyres began to move around the world quantities of *Ae. albopictus* eggs, allowing the rapid diffusion of the species out from the original areas (from Japan to Madagascar).

In Italy the species was discovered for the first time in 1990 around Genova harbour (Sabatini et al., 1990).

This species have spread very fast after its introduction, showing a high level of adaptability to the Italian environment (Romi, 1995).

The Asian tiger mosquito in Piedmont

The first observation of *Ae. albopictus* in Piedmont is reported in 1994, related to a stock of old tyres (map of infestation rate in monitored municipalities). The first infested municipality was San Mauro Torinese (Centro Agricoltura Ambiente, 2001).

In the last 15 years the species gradually invaded a lot of suburban areas in the plains and lower hills of the Piedmont. Now the infestation covers at least 30 municipalities on 129 monitored and 6 of the 8 provinces of the Piedmont (map of evolution of Ovitrap monitoring network and infestation trend). In the urban areas the Asian tiger mosquito has reached high level of nuisance.

Many local Administrations did not never had mosquito problems, so were found off their guard.

In Piedmont, adults fly usually from April to October-November at lower altitudes.

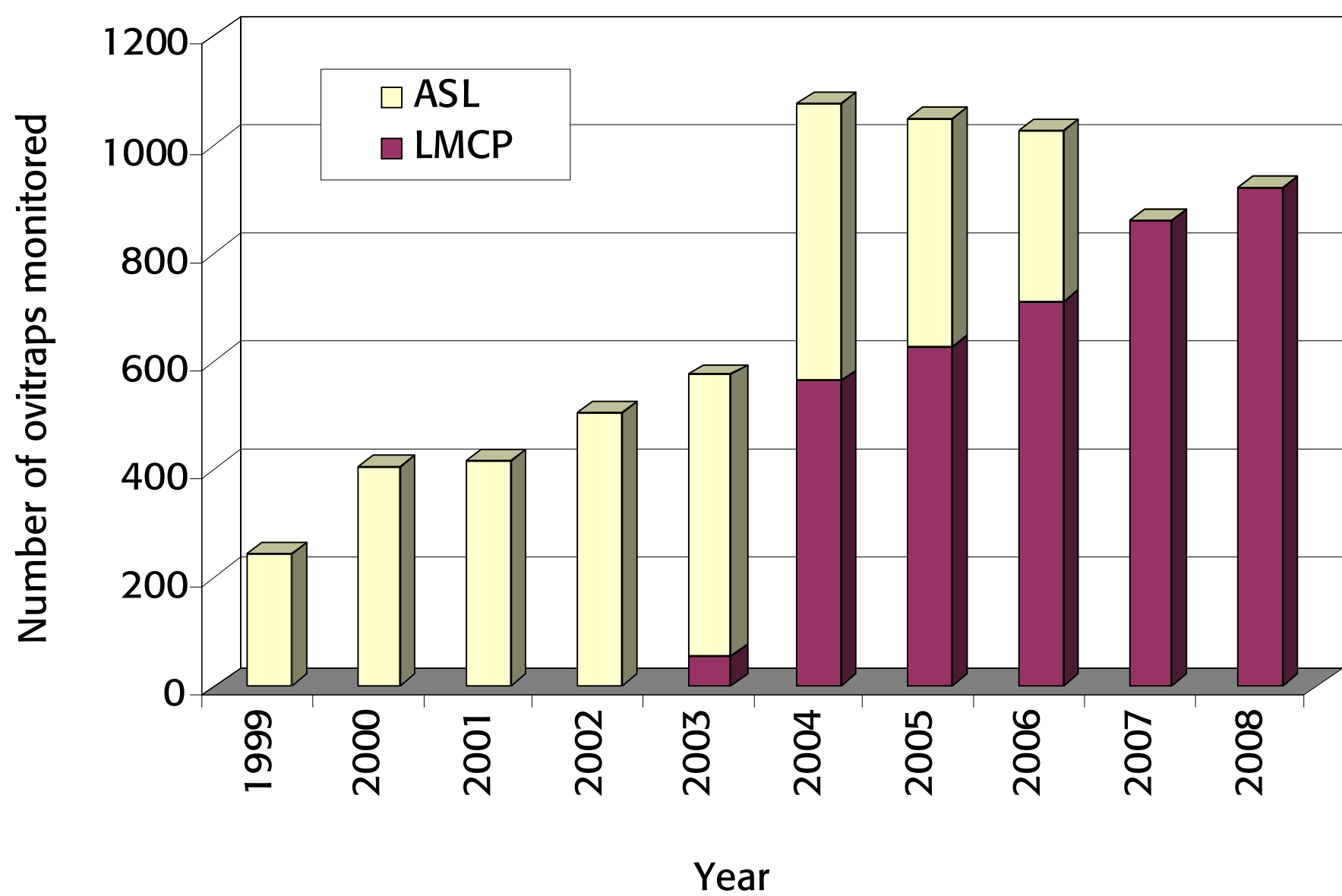
The highest adult densities are registered between the middle of August and the middle of September. However it is strictly related to the weather (temperature, rain, humidity, etc.), the environmental characteristics (urbanizations, altitude, etc.), and the breeding site characteristics (dimensions, volume, sunny exposition, etc.).

In 1995 the Regional Council approved a law (Regional Law 75/95) to contrast the mosquito problems in Piedmont, mainly due to the high density of mosquitoes living in the rice-field areas..

Since 1997, the Regional government has launched a specific monitoring programme, in order to prevent *Aedes albopictus* diffusion and to reduce the annoyance to the local people living in the infested areas CAA, op. cit.). The local Public Health Services were involved in the programme , under the management of the Centro Agricoltura Ambiente "G. Nicoli", Crevalcore, Italy (CAA).

First of all, a census was conducted in order to identify the main risk areas (old tyres dumps, junkyards, etc.). Then, an ovitraps based monitoring activity was organized for the highest risk areas. Experimentally in 2003, and extensively in 2004, the monitoring was extended to the residential areas of the main towns included in the local mosquito control projects funded by the Regional Law 75/95 (Graph 1).

In 2007 Istituto per le Piante da Legno e l'Ambiente (IPLA) succeeded to the CAA in the mosquito control project management, and the local mosquito control projects gradually replaced the Public Health Services.

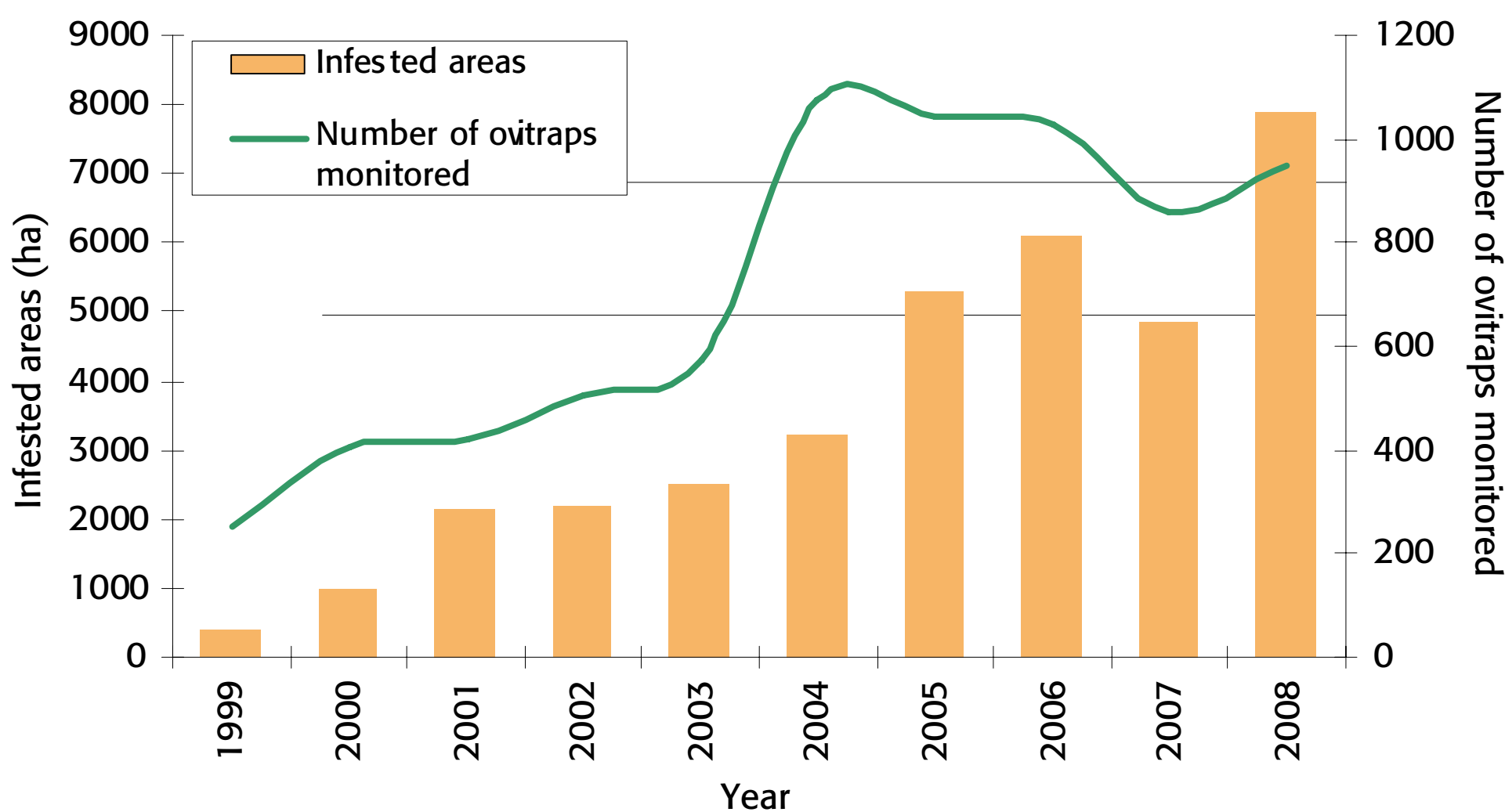


Graph 1 - Ovitrap monitoring by local Public Health Services (ASL) and by local mosquito control projects (LMCP) in Piedmont in the period 1999 - 2008

Graph 2 shows the infestation trend during the last 10 years on the basis of all available data. This picture doesn't show the real range of the species in Piedmont, because only 129 municipalities out of 240, and the number of ovitraps changes in the different monitored municipal areas. Their importance is in showing the global trend during the years.

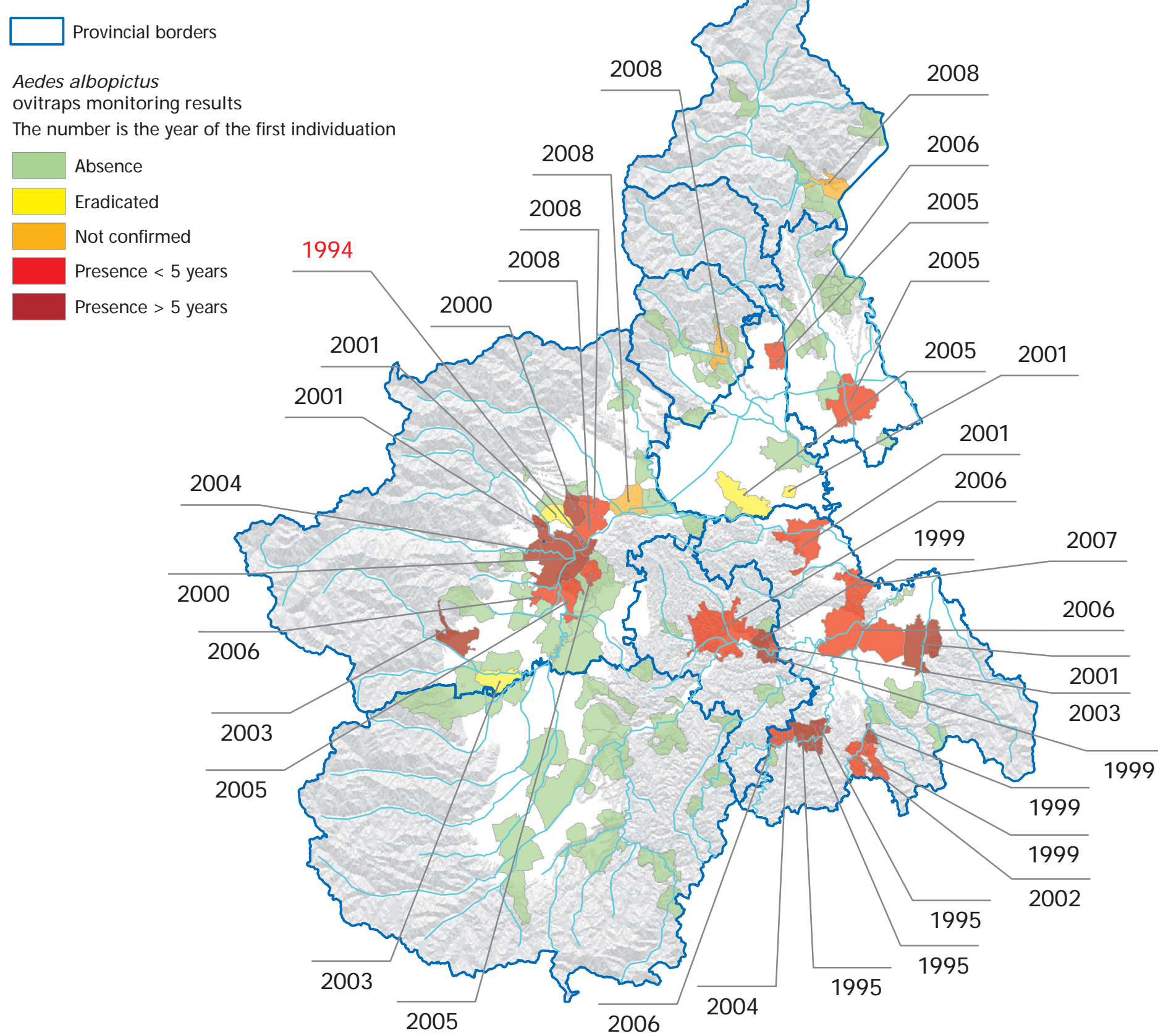
In 2008, the increasing of the regional range of the species has been higher than in the years 2005-2007.

Likewise, after a reduction recordered in 2007, are also increased the monitoring points infested. Nevertheless, the results of the project are good, because during the past decade in various cases the monitoring system permitted to discover new infestations in time for eradication, and in comparison with the situation of other North Italian regions (Romi et al., 2008), in Piedmont the spread of *Ae. albopictus* has been slowed down.

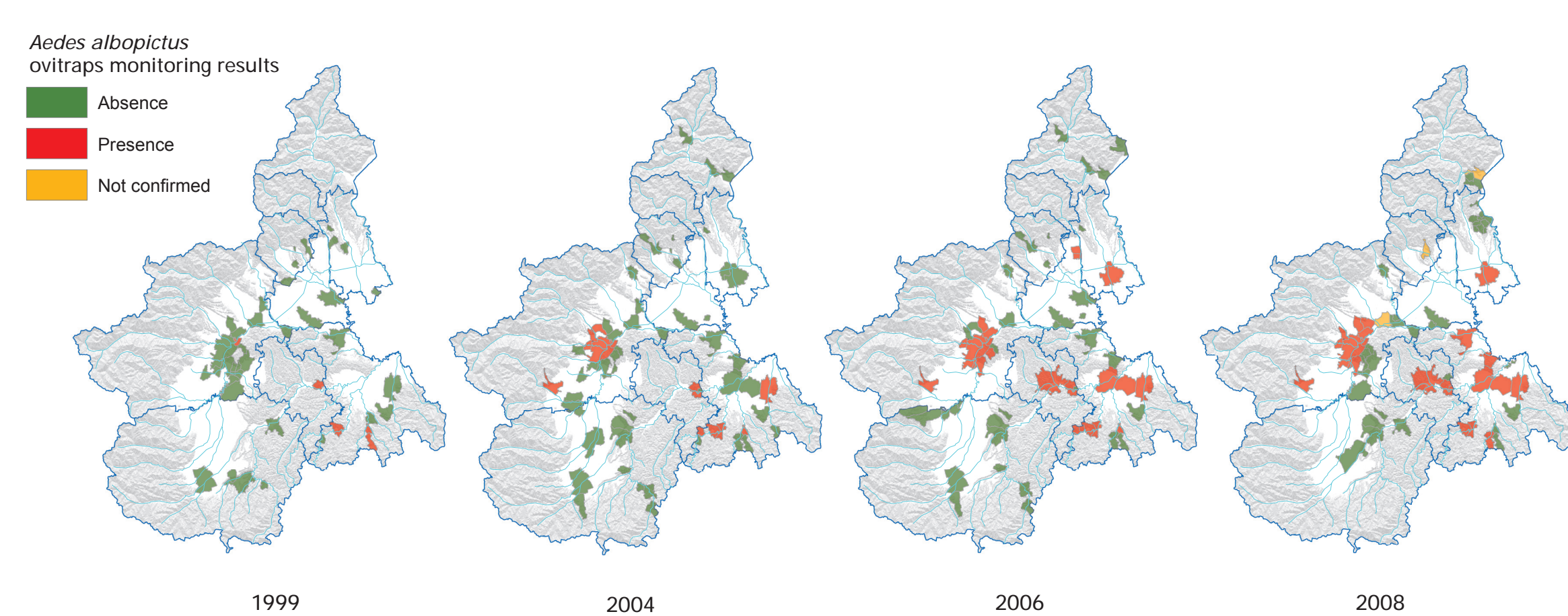


Graph 2 - Territorial expansion of *Aedes albopictus* in Piedmont

Infestation rate in monitored municipalities



Evolution of Ovitrap monitoring network and infestation trend



Control strategy

The control involves different subjects (municipalities, Public Health Services, citizens, etc.) and consists in the following traditional activities:

- 1) ovitraps based monitoring
- 2) capillary larvae disinfections in private and public catch basins
- 3) research and removal of the breeding sites
- 4) Mayor bylaws
- 5) adulticides in the critical areas
- 6) widespread information campaigns finalized in changing the people habits to prevent and remove the domestic breeding sites.

Level of infestation	Aim	Control strategy
Negative	To prevent the infestation of <i>Aedes albopictus</i>	Information and involvement of citizens. Monitoring of critical areas based on ovitraps
Infested areas < 10%	To eradicate	Increase of ovitraps number in infested area, research and removal of breeding sites. Census and capillary disinfections of private and public catch basins
Infested areas 10-50%	To limit the spread of <i>Aedes albopictus</i>	Intensification action of breeding site removal every urban area. In addition to larvicide disinfections, adulticides interventions are planned to be undertaken in the critical areas.
Infested areas > 50 %	To reduce the infestation of <i>Aedes albopictus</i>	Capillary action of breeding site removal in every urban area, intensification of larviciding and adulticiding and restrictive bylaws

Conclusions

Monitoring activity and control are essential to prevent any further spread of the species, and to minimize the nuisance where the eradication is impossible. So all the potential areas should be monitored and controlled, regardless of the will of the local administrations.

Furthermore, only the presence of a strong operative project permits to operate immediately where a new infestation appears for trying eradication measures.

Without an operative structure, a monitoring network, even well organized, cannot adopt quickly control methods.

Local administrations have an important role too. In particular they can easily involve the local communities in order to reach the final goals.

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