



Evaluation of the effectiveness of three sticky traps to monitor four species of cockroaches (Hexapoda: Blattaria) with simulated use tests

A. Drago¹, F. Montarsi², M. Dutto³, S. Martini¹, M.L. Vitale¹

¹ Entostudio s.r.l, Ponte San Nicolò (Padua), Italy; ² Istituto Zooprofilattico Sperimentale delle Venezie, Legnaro (Padua), Italy; ³ Studio di Entomologia e Fitopatologia, Verzuolo (CN), Italy



Introduction

Sticky traps are the best tool to monitor the presence of cockroaches and in the case of low infestations they can represent an effective control tool. These kinds of traps are cheap and easy-to-use. They are employed by pest control companies, as well as by private citizens and researchers. Several types of sticky traps are available on the market. These traps are different in shape, color, number of openings, position of the glue surface and type of attractant. The effectiveness of a trap can vary depending on the target species. In this study, three of the most employed sticky traps in Italy were tested to catch separately four local species of cockroaches.

Materials and Methods

Four species of cockroaches were employed: *Blatta orientalis*, *Blattella germanica*, *Periplaneta americana* and *Supella longipalpa*. All the tested species are reared in colonies at the Entostudio laboratory since 2011.

Three types of traps were compared:

- **INDIA trap** (India, Industrie Chimiche S.p.A., Padua, Italy) with and without its own food bait tablet (**INDIA-A** and **INDIA-E**, respectively);
 - **ZAPI Simply trap** (ZAPI Expert S.r.l., Conselve, Padua, Italy), in which the attractant is incorporated in the glue;
 - **CATCHMASTER Spider & Insect Glue trap** (AP&G Co. Inc., Brooklyn, NY 11232, USA), in which the attractant is incorporated in the glue.
- All the traps were made of cardboard.

Each test (one species with one kind of trap) was replicated five times.

The test was performed in a rounded arena 1.0 m in diameter and 35.0 cm tall, covered with a nylon film on the top to prevent insects escape. Each arena contained a: Petri dish filled with water, a shelter made of black cardboard, a Petri dish filled with ten cat biscuits and one of the tested traps. Each arena held 10 ♂♂, 10 non-gravid ♀♀ and 30 juvenis (neanids and nymphs).

16 hours after the introduction of the cockroaches, the trap was collected and the caught cockroaches counted.

Results

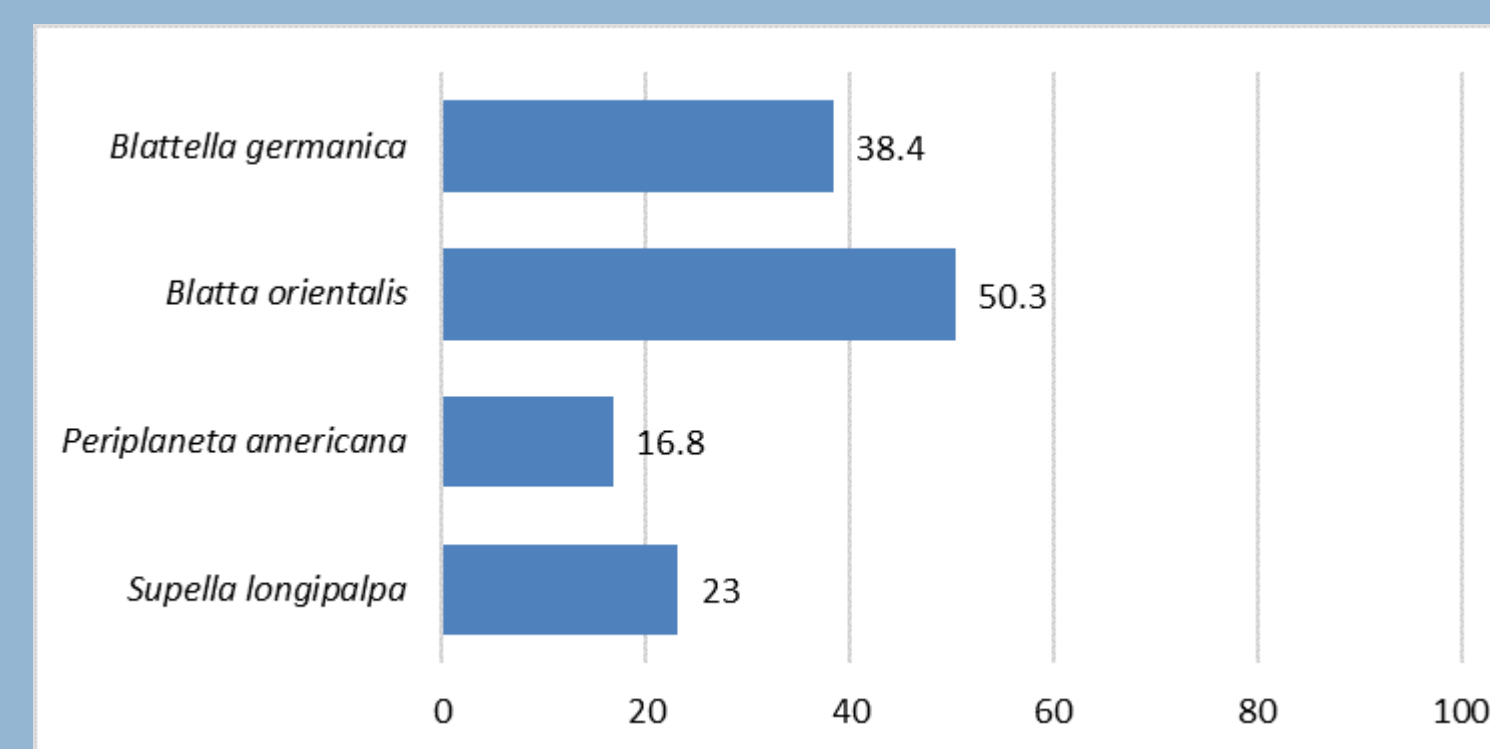
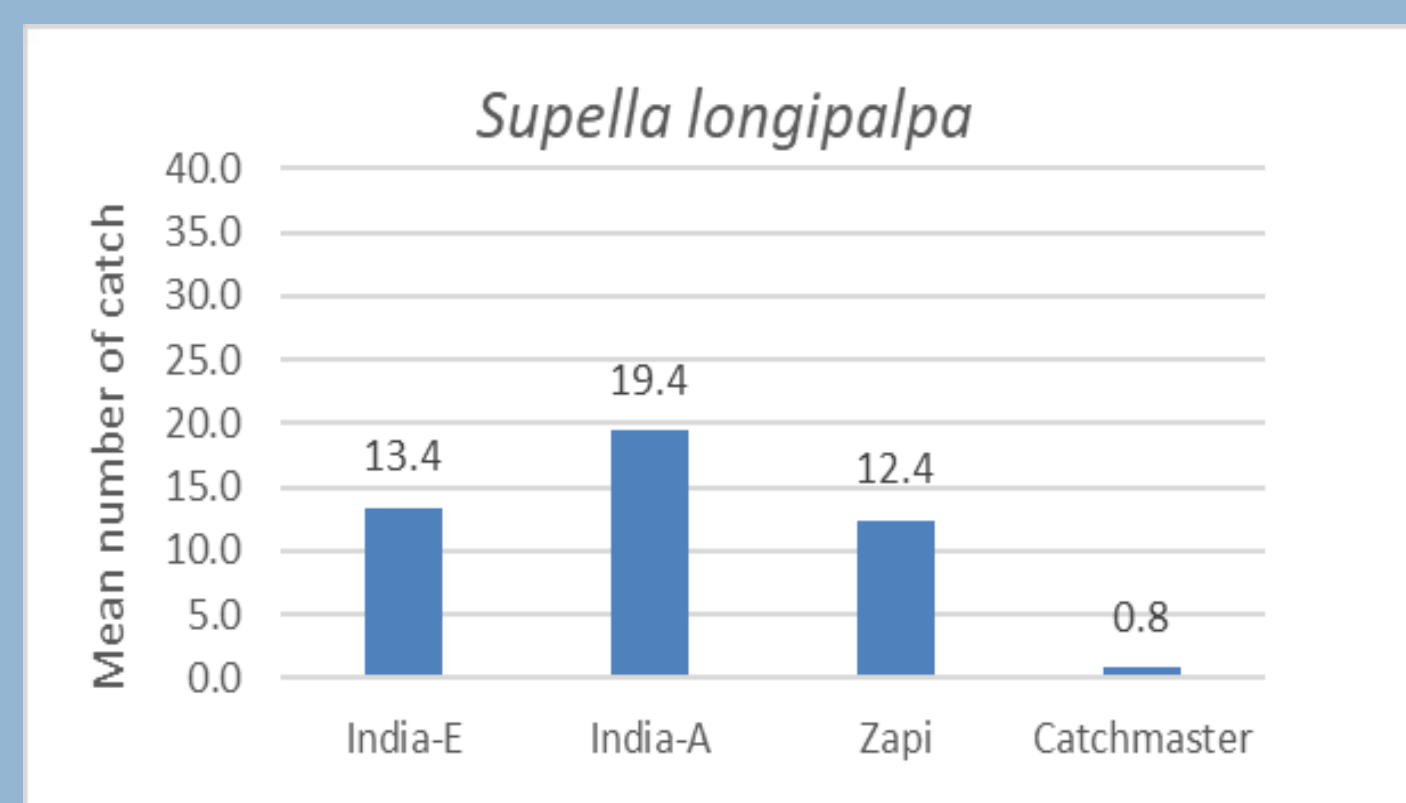
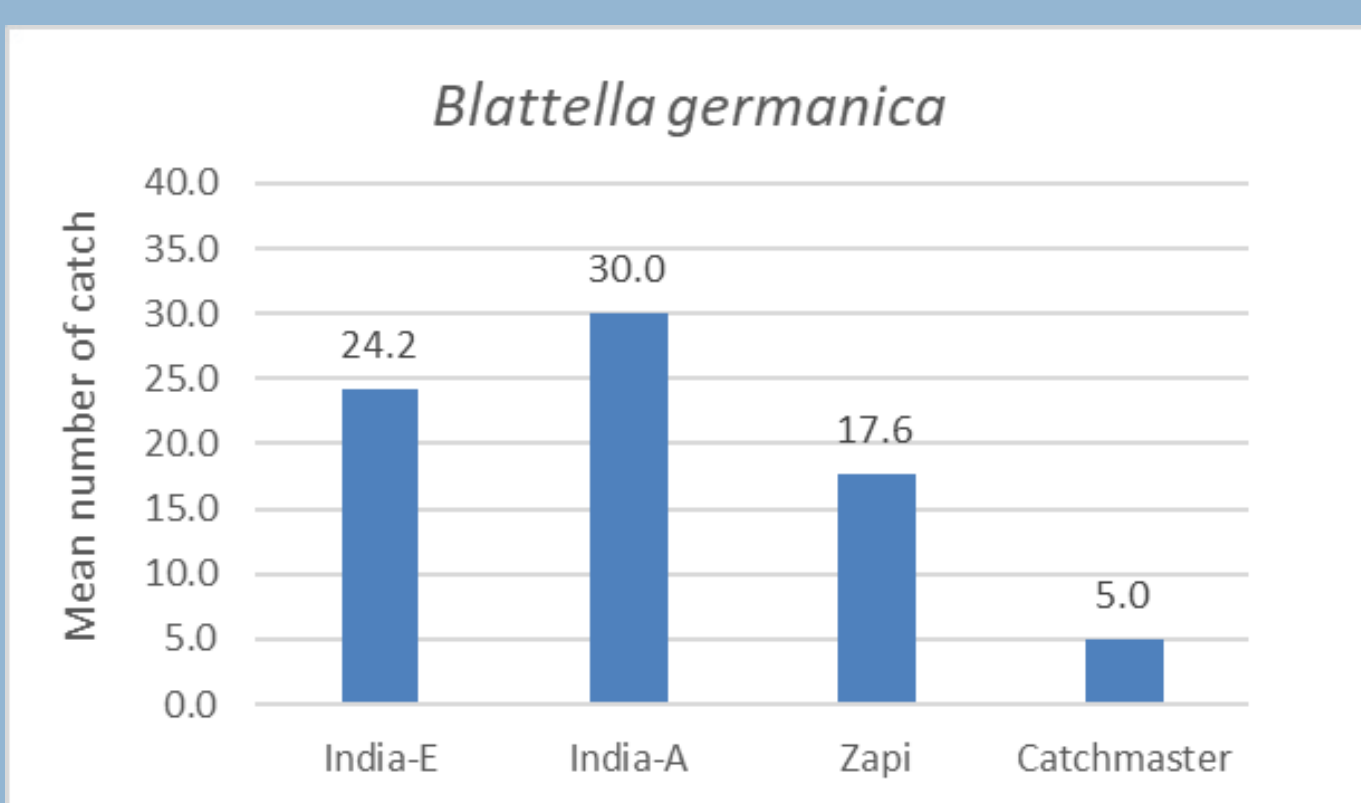
INDIA traps, particularly the INDIA-A ($p < 0.01$), were the most effective in capturing all the species. The addition of the attractant tablet in the INDIA traps did not improve significantly the catch.

CATCHMASTER trap showed the lowest performance with all species ($p < 0.01$).

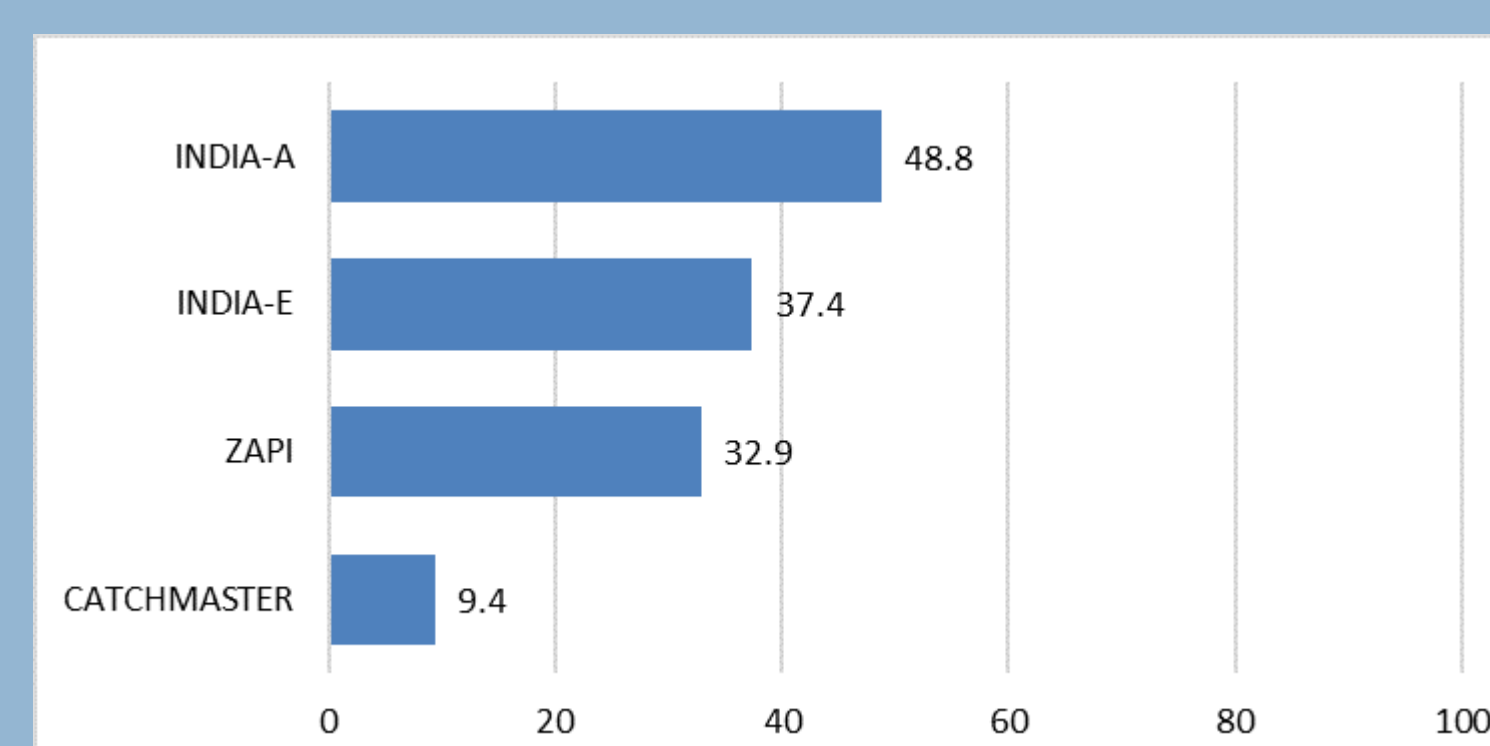
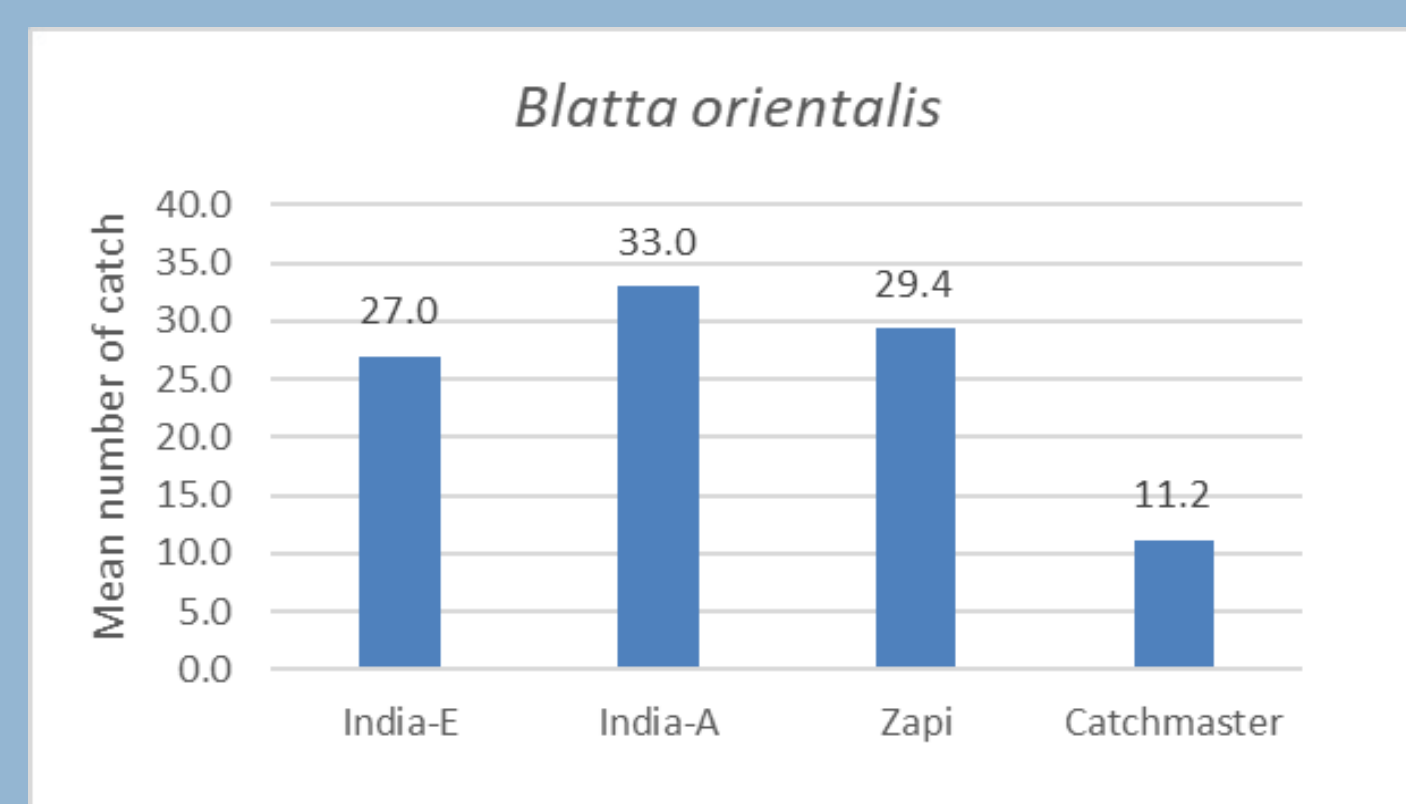
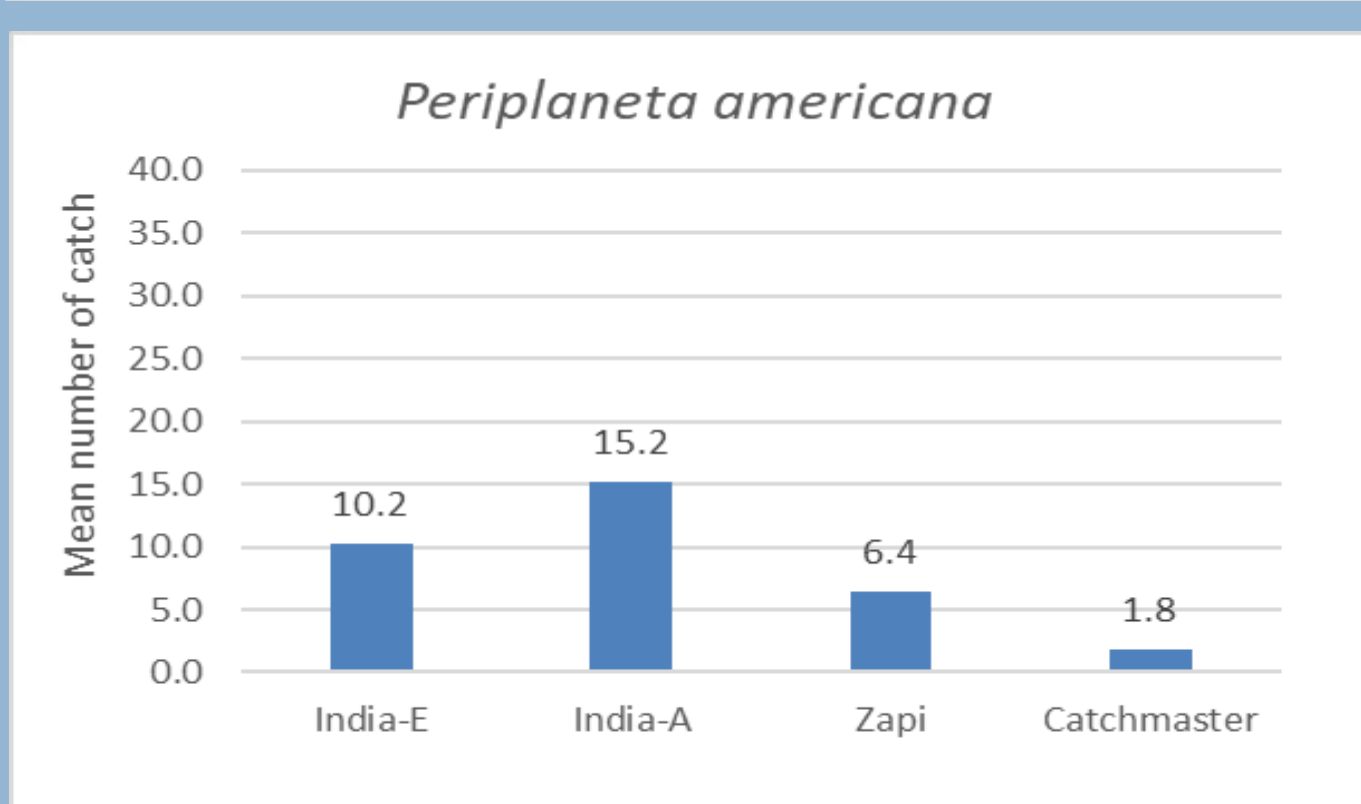
B. orientalis was the species most abundantly caught by all traps followed by *B. germanica*, *S. longipalpa* and *P. americana*.

No significant difference in catch according to developmental stage was observed.

ZAPI trap showed for *P. americana* a statistically significant preference in catching juvenis (neanid and nymph) instead of adults.



Percentage of each species of cockroaches caught at the end of the experiment by all the traps. The value includes all species, all the life stages and both sexes.



Percentage of catch by each trap on the total of cockroaches released in the arenas. The value includes all species, all the life stages and both sexes.

Discussion

In this experiment, any trap showed a marked selectivity toward given species.

The catch rate depended more on the species than on the trap: some species have a greater predisposition to be caught than others, irrespective of the trap. *B. orientalis* is the easiest species to be caught, on the contrary *P. americana* was the species caught at the lowest rate (16.8%). A reason could be its bigger size and strength that make it able to detach from the glue.

The ability of detaching from the glue varied also according to the strength of the glue. The ZAPI trap's glue is probably less powerful and this would explain why this trap trapped more juvenis than adults of *P. americana*. In the CATCHMASTER trap cockroaches were often found on the border of the glue surface. It is possible that they detached from the glue without exceeding the threshold of the trap.

The presence of the attractant tablet did not increase the catch in a significant way.

None of the traps caught all the specimens present in the arena. The hypothesis is that cockroaches are able to memorize the risk related to the trap and consequently learn to avoid it after having escaped.

Many studies show that traps cannot replace the insecticide treatment precisely because they are not able to catch all the specimens even if there is still free space on the glue surface.

Conclusions

Within the tested traps our results indicate that the INDIA-A is the best to employ with all the considered species. *P. americana* and *S. longipalpa* were not adequately caught by any of the tested traps; therefore, the behavior of these species should be better investigated, to more successfully create traps modeled to catch them.



INDIA-A



INDIA-E



ZAPI



CATCHMASTER