

A comparative analysis of four different models of aspirating luminous traps for flying insects

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Aim: To examine and compare the efficiency and the capturing selectivity of some types of aspirating luminous traps for flying insects present on the market.

Methods: Four models of traps were examined (Insectivoro, Mosquito Trap, Kyoto/wood and Kyoto) all of which had lamps serving as lures but with different forms, power and emission spectrums (although the latter have in common a wave length peak of about 352nm) and which all have an aspirating fan to catch the insects. One of the traps analyzed, the Mosquito Trap, is definitely different from the others since, besides being equipped with a new luring system based on emissions of Octenol, presents a source of heat, four LED buttons (red, blue, green and white) and a low power lamp mounted internally to the black plastic structure. Among other things, the aspirating fan is positioned perpendicularly to the plane of light propagation. Instead, the other traps tested (Insectivoro, Kyoto/wood and Kyoto) take advantage of the full power of the lamps which, for this reason, are positioned externally to the structure and they mount aspirating fans whose field of action is concentrated immediately behind the luminous source, extending into the external space near the entrance. The strategy of analysis adopted consisted in programmed rotation of the luminous traps set out in four different territorial typologies (vegetable gardens and barns, agricultural fields, meadows and private gardens), all characterized by the presence of numerous varieties of insects and, therefore, adapted to the type of investigation carried out. The insects were counted and evaluated to the level of the family. The experimentation was carried out in the periphery of the town of Crespellano (Bo) between Friday, 2 September, 2005 and Sunday, 25 September, 2005.

Model of trap	Bait	Total bugs captured	
1: Insectivoro	FCS/32W/350BL (Circular)	11630	
2: Mosquito Premier Trap	F4T5/4W/BL Led R/B/G/W Resistance Octenol strip	2544	
3: Kyoto/wood	F15W/T5/BL350 (Wood)	4736	
4: Kyoto	F15W/T5/BL350 (Normal)	5987	

Results and conclusions: In the Table on the side, the data relative to the quantitative totals of insects captured by each trap is listed. This allows an initial comparison of the efficiency of the traps, pointing out, from this point of view, the superiority of the Insectivoro trap which is capable of carrying out its action on a larger area due to its greater luminous power and, therefore, to attract greater quantities of flying insects; in fact, this trap alone captured 46.8% of the insects. More in-depth considerations show a correlation between the performance obtained with the Insectivoro, Kyoto/wood and Kyoto traps for which, relating the total values of the captures to the

power of each lamp, an equal capacity of daily capture of 15 insects per watt is obtained. On the contrary, the Mosquito Trap distinguishes itself for the selectivity shown towards Diptera Nematocera: in fact, 89.03% of the insects captured by this device belong to this group and, in particular, to Cecidomyiidae (44.22%), Psychodidae (17.69%) and Culicidae (14.39%). We feel that the reason for this selectivity can be correlated, on the one hand, to the presence of specific systems to lure the hematophagous Diptera, such as the heat source and the emission of Octenol, but also to the characteristics of the system of aspiration. In fact, as has already emerged in previous experimentation (Di Domenico *et al.*, 2002, Atti XIX Congr. Naz. Ital. Entomol.: 1021-1026), there seems to be a direct physical correlation between the aspirating power of the fans and the dimensions of the insects captured. For this reason, the Mosquito Trap has an aspirating system which is more suitable for capturing small insects such as Nematocera and, in particular, Culicidae which it was evidently designed for, given that its aspirating action is limited to the inside of the trap reducing the external air turbulence to a minimum, thus facilitating the entrance of small insects; however, it is not powerful enough to capture larger insects. Instead, the other three traps tested have a powerful capturing action which extends to all flying insects.

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