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A New Version of the Prototype for Mechanical Distribution of Beneficials

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Abstract

A new version of the device patented by University of Catania and already used in natural enemy distribution trials on greenhouse vegetable crops has been designed and constructed in order both to increase the work capacity and to promote a low impact pest control, which respects the environment and consumers' and farmers' health.

This version has the same working principle of the former prototype, but materials and dimension of the hopper, the distributor and the rotating disc have been changed.

Currently, it is made up of a conical aluminium hopper to hold and to measure out the product. The top is fitted with an electric motor which governs the rotation of a distributor, fixed along the vertical axis of the hopper. Product falls onto an aluminium distributor disc which rotates around its vertical axis by means of a second direct-drive electric motor attached below the prototype.

With this model, set on a handle directly carried by the operator, the device performance will be improved both in distribution uniformity in time and in manoeuvrability within a greenhouse. Consequently, greater work capacity and higher work quality will be achieved.

Several laboratory trials, preliminary to field tests, have been carried out to evaluate some machine parameters: the throw direction, the spatial distribution, the quantity distributed, the uniformity of throw in time, the vertical distribution of product at different distributor heights as well as at different distances from the test bench. The tests were run with inert material commonly used for marketing bottles of beneficials: humid vermiculite and buckwheat husks mixed with humid vermiculite.

Moreover, experienced entomologists have evaluated throw effects on natural enemies vitality, with samples both from the hopper and from the rotating disc throw. Negligible or absent impact on natural enemies proves prototype efficacy and enables its usage both with technical and economic advantages on manual distribution, which is actually practised in Italy.

The preliminary tests are really encouraging and let us think about a possible wide diffusion of this device for beneficial distribution in biological crops.

Keywords: Greenhouse, natural enemies, plant protection machines, sustainable pest management