

## **Development of a prototype for mechanical distribution of natural enemies**

Manetto G., Failla S.

*University of Catania, DiGeSA, Section of Mechanics and Mechanisation*

*Via Santa Sofia, 100 – 95123 Catania, ITALY*

*Tel. ++39 0957147513, Fax ++39 0957147600*

*Email corresponding Author: gmanetto@unict.it*

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### **Aim**

The European Directive 2009/128/CE involves, among other measures, the compulsory adoption of integrated control strategies starting from January 2014. Moreover, biological and integrated control measures are widely and effectively employed both on vegetable crops and on ornamental crops. The release of natural enemies on crops is carried out manually with a considerable work time and without a uniform distribution. Therefore, a prototype for mechanical distribution of natural enemies was developed and realised. This study refers on the improvement of the prototype carried out to make it adoptable both in greenhouse and open field and on the laboratory tests carried out to assess its performances.

### **Methodology**

Several versions of the prototype were produced without changes in the functioning principle, but only in some of its components, in order to improve the prototype performance and the components coupling. All the improvements were evaluated by means of laboratory tests in order to assess direction of the jet, uniformity of the flow rate, operative width and uniformity of distribution both horizontal and vertical plane.

### **Results**

In order to assess the applicability of the centrifugal action to the natural enemies distribution, laboratory tests were carried out with the first version of the prototype. The possibility to regulate direction of the jet and flow rate of the natural enemies released in accordance to the work conditions was assessed with the subsequent models of the prototype. Also the distribution, evaluated on a horizontal and vertical plane, seems to be suitable for applications in biological control programs. Furthermore, the versatility of the prototype to operate both in greenhouse and in open field has been verified.

### **Conclusion and Perspectives**

A satisfactory flexibility of its use has been achieved with the last version of the prototype. In fact, it is applicable to a bar directly carried by an operator, to a frame or to a tool-bar applied to a tractor or a trolley and it can operate both in greenhouse and in open field. However, others evolutions could be useful in order to make constant the flow rate of the product also during the final emptying phase of the hopper.