Kaolin protects olive fruits from *Bactrocera oleae* (Gmelin) infestations unaffecting olive oil quality

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Abstract: The efficacy of the processed kaolin "Surround WP" to control olive fruit fly, *Bactrocera oleae* Gmelin, field infestations was investigated in east Calabria. The preliminary results showed that fruit infestation levels were significantly reduced on kaolin-treated trees compared with untreated trees. The promising results of these experiments points to the feasibility of using particle film technology composed of a non-toxic material, to avoid olive fly damage as an alternative to the applications of rotenone in organic orchards. Finally, kaolin treatment unaffected the nutritional and sensory quality parameters of the corresponding virgin olive oils obtained by a laboratory scale olive mill, thus satisfying the present quality requirements.

Key words: Kaolin, *Bactrocera oleae*, olive, olive oil quality.

Introduction

Alternatives to synthetic chemical pesticide as well as organic pesticide are today required to reduce the heart pollution, improve the safety condition and to ensure safer foods. Kaolin-based particle film is a new tool to protect fruits (Mazor M. And Erez A., 2004) and olives (Sour and Makee, 2004) from fly infestations. Therefore, the efficacy of the kaolin to control olive fruit fly, *Bactrocera oleae* Gmelin, field infestations was investigated in east Calabria.

Materials and Methods

A kaolin-based particle film formulation commercially available under the trade name Surround WP Crop Protectant (Enghelhard Coorporation, Iselin, NJ, USA) was used. The effectiveness of the kaolin to contrtol B. Oleae was investigated in two olive groves located at Strongoli (KR), in the est part of Calabria. The experiment was carried out during two years on bearing 50-year-old oil olive trees (cv. Carolea). In each trial, 20 trees were chosen for their homogeneity in terms of canopy and production. Treatments consisted of single trees arranged in a completely random design with three replications. Rotenone at the first grove and Surround WP at the second grove were sprayed one time in 2004 year and two times in 2005 year, on 22 september and 14 and 28 september, respectively. The olive oils were obtained by a laboratory scale olive mill (Toscana Enologica Mori, Tavernelle Val di Pesa, SI, Italy). Olive oils were analysed by EU Official Methods (Reg. CE 1989/2003).

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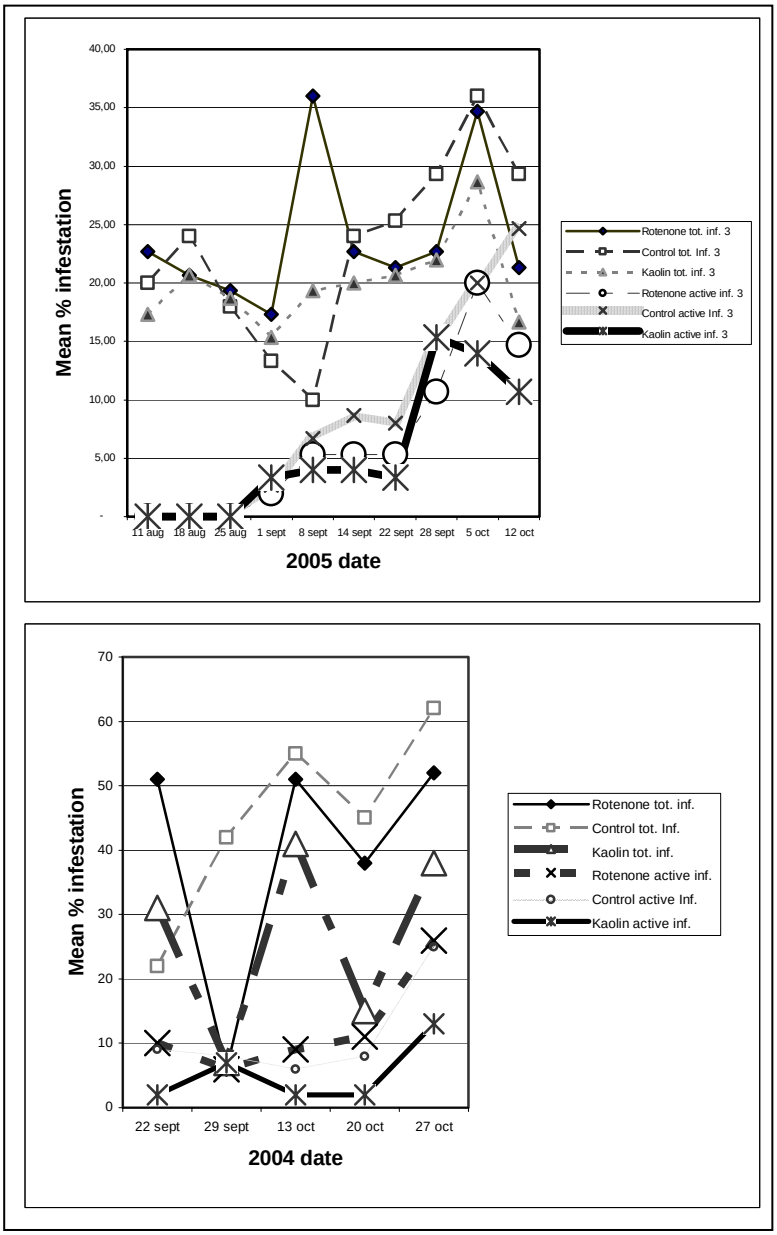

Figure 1. Evaluation of *Bactrocera oleae* mean percentage total and active infestations on olive trees sprayed with kaolin particle film and unsprayed control.

Results and discussion

There was a significant difference between kaolin based particle film and control treatments in the mean percentage of olive attacked by *Bactrocera oleae* in the second year on 5 october, the day of the olive harvest and olive oil production, seven days after the second spray (Table 1).

Table 1. Mean percentages of olive fruits active infestations

Mean percentage	
Rotenone active infestation	20a
Control active infestation	20a
Kaolin active infestation	14b
Tukey test, P<0.05	

Moreover, the promising results of these experiments points to the feasibility of using particle film technology composed of a non-toxic material, to avoid olive fly damage as an alternative to the applications of rotenone in organic orchards. Finally, kaolin treatment unaffected the nutritional and sensory quality parameters of the corresponding virgin olive oils obtained by a laboratory scale olive mill, thus satisfying the present nutritional (table 2) and sensory (Figures 2 and 3) quality requirements.

Table 2. Mean of the main olive oil quality parameters

	Kaolin	Crontol
Tocopherol	250.60	260.21
Total phenols	193.43	170.13
C18:1	75.868	75.625
C16:0	13.513	14.565
Delta K	-0.002	-0.003
K 270	0.094	0.113
K 232	1.667	1.603
Peroxide Index	5	5
Free Acidity	0.428	0.428

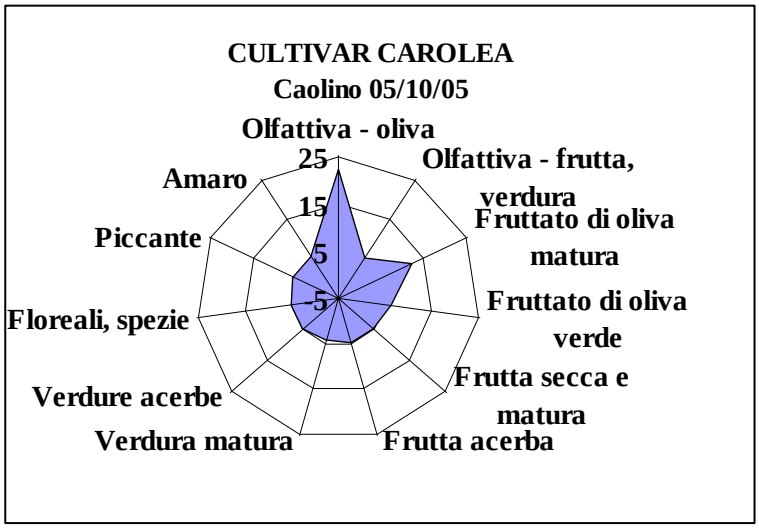

Figure 2. The sensory profiling of olive oil from Kaolin treated olives.

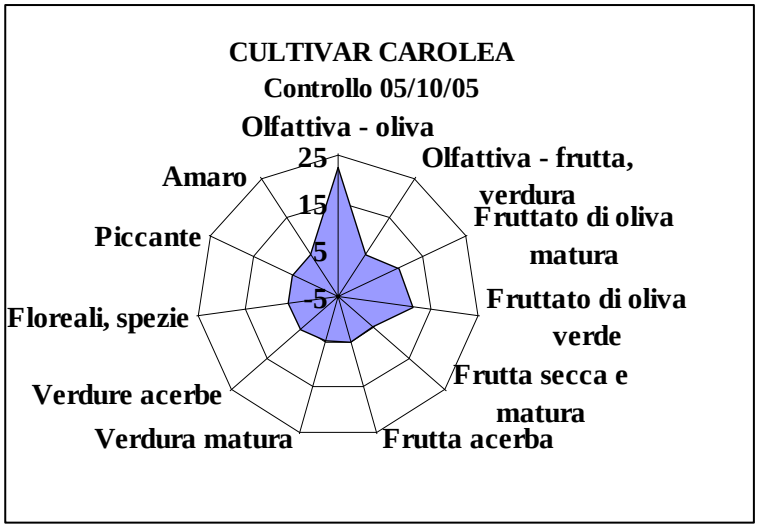

Figure 3. The sensory profiling of olive oil from control olives.

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