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**Book of Abstracts**

**Guest Editors: Massimo Trabalza-Marinucci (Coordinator),  
Cesare Castellini, Emiliano Lasagna, Stefano Capomaccio,  
Katia Cappelli, Simone Ceccobelli, Andrea Giontella**



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**P058****Accumulation of manganese, copper and silver in honey bee organism, depending on the concentration and the type of the pesticide**

Paweł Migdał, Adam Roman, Ewa Popiela-Pleban, Yekaterina Zonova

*Katedra Higieny Środowiska i Dobrostanu Zwierząt, Wrocław University of Environmental and Life Sciences, Poland*

Contact: pawel.migda@upwr.edu.pl

Intensive agriculture requires continuous improvement of systems, weed control and pests. It is estimated that approximately 1/3 of crops are pollinated by the honey bee (*Apis mellifera* L.), which are exposed to pesticides of different groups. The aim of the study was to examine the effect of selected pesticides on the accumulation of elements (copper, manganese and silver) in the bodies of these insects. We selected manganese and silver because they negatively affect the behavior and lead to disturbances in chitin synthesis, while copper is a natural component of the hemolymph of bees. The study used the worker bees at the age of 10 days, which were placed in treated cages (50 × 150 × 150 mm; 100 honey bees/cage). They were maintained in laboratory conditions (temperature 25 ± 2 °C, humidity 75%) for 7 days. Three pesticides were used in the experiment: fungicide (F - C<sub>16</sub>H<sub>22</sub>ClN<sub>3</sub>O), insecticide (I - C<sub>9</sub>H<sub>10</sub>ClN<sub>5</sub>O<sub>2</sub>), herbicide (H - C<sub>3</sub>H<sub>8</sub>NO<sub>5</sub>P), while the control group (K) was not treated. Honey bees were fed sugar syrup (60% w/w) with the addition of the pesticides for the experimental groups. Three different concentrations of pesticides were used: one practical concentration comparable to that used in field conditions (F – 0.62 g, I- 0.75 ml, H- 4 ml); a 1.5 fold higher concentration than the practical dose (FH – 0.93 g, IH – 1.13 ml, HH – 6 ml); a 0.5-fold lower concentration than the practical dose (FL – 0.31 g, IL - 0.38 ml, HL – 2 ml) each was dissolved in 1000 ml of syrup. Dead honey bees were collected in labeled containers and frozen (-20 °C). The analysis of elements was carried out using the technique of F-AAS. Data were analysed using a one-way ANOVA and comparisons were performed using the Kruskal – Wallis test. The concentration of manganese in the bees was higher in the I group, compared to the FH group (69.88 ± 2.39 vs 54.22 ± 10.22 mg/kg DM;  $p < .05$ ), and was not related to the composition of the pesticide. The concentration of copper was numerically higher in the IH group compared to the K group (25.29 ± 0.38 vs 21.98 ± 1.03) mg/kg DM, although not significant ( $p > .05$ ). Similarly, the silver content in the K group was numerically lower compared to the HH group (0.20 ± 0.06 vs 0.28 ± 0.23)

mg/kg DM), with no statistical significance ( $p > .05$ ). It is concluded that pesticides influence the content of these elements in the organism of honey bees. Such condition, especially in the case of manganese, can adversely influence the condition of bees.

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**P059****The use of *Azospirillum* as a tool for promoting sustainable production of silage maize: a preliminary evidence under field condition**

Francesco Serrapica<sup>1</sup>, Felicia Masucci<sup>2</sup>, Antonio Di Francia<sup>2</sup>, Maria Serrapica<sup>1</sup>, Giuseppe De Rosa<sup>2</sup>, Corrado Pacelli<sup>1</sup>

<sup>1</sup>*Scuola di Scienze Agrarie, Forestali, Alimentari ed Ambientali, University of Basilicata, Italy*

<sup>2</sup>*Dipartimento di Agraria, University of Napoli Federico II, Italy*

Contact: francesco.serrapica@unibas.it

The aim of this on-farm study was to evaluate the use of N<sub>2</sub>-fixing rhizobacteria *Azospirillum* in maize cropping as a strategy to reduce the use of nitrogen fertilization. The trial was conducted on an irrigated plain farm. Seeds of *Zea mays* were inoculated with a commercial product (Graminosoil srl®) based on *Azospirillum* spp. live cells at the dose of 5x10<sup>-4</sup> cell form unit/kg seed. The treatments were MC (not inoculated maize seeds, fertilization: N 250 kg ha<sup>-1</sup>) and MA (inoculated maize seeds, none fertilization) that were arranged in 2 contiguous areas, 1 ha each. Maize was harvested at the milky-waxy ripening stage. Measurement of the yield components and of the plant traits were made at harvesting, on a 3 strips (10 m long) per plot. For each strip, 50 plants were manually cut at 10 cm above the ground and weighted in order to determine biomass yield. Moreover, 3 sub-samples, each consisting of 3 plants, were collected to evaluate the plant traits. To this purpose, plants were separated in culm, cob and leaves and the following traits were recorded: culm height, number of green leaves, leaf area, weight of the culm, cob, and leaves. Leaf Area Index (LAI) were calculated based on the leaf area and the plant density for unit area (m<sup>2</sup>). Finally, 3 samples/plot of freshly chopped forage were collected in order to determine the dry matter content (DM) and chemical composition

(Foss NIR systems 6500, Silver Springs, MD). Data were analyzed by using one-way ANOVA, with treatment as factor. By comparing plant traits recorded for MC and MA, the plant height (294 vs 298 cm), number of green leaves (15.7 vs 15.9), leaf area (0.63 vs 0.64 m<sup>2</sup>), and LAI (4.76 vs 4.77) were not influenced by the treatment ( $p > .05$ ). Likewise, no significant differences ( $p > .05$ ) could be detected for the weights of culms (412.0 vs 430.4 g), cobs (416.9 vs 430.9 g), and leaves (141.7 vs 142.5 g). As a consequence, the total biomass yields from MC and MA (72.92 vs 75.28 Mg ha<sup>-1</sup>, respectively) were not statistically different ( $p > .05$ ). In regard of fresh forage chemical composition, no differences were found in terms of DM (34.6 vs 34.7%), crude protein (6.9 vs 6.9%DM), crude fibre (21.8 vs 21.9%DM), ether extract (1.0 vs 1.0%DM), ash (4.8 vs 4.9%DM), and NDF (50.7 vs 50.8%DM). Based on these preliminary results, seed's inoculation with *Azospirillum* may represent a viable tool for improvement of environmental effects of maize.

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## P060

### Ventilation and evaporative cooling of the resting area in free stalls dairy barn

Ferdinando Calegari<sup>1</sup>, Dario Rossi<sup>2</sup>, Luigi Calamari<sup>2</sup>

<sup>1</sup>Centro Ricerca Analisi geoSpaziale e Telerilevamento, Università Cattolica del Sacro Cuore, Italy

<sup>2</sup>Facoltà di Scienze Agrarie, Alimentari e Ambientali, Università Cattolica del Sacro Cuore, Piacenza, Italy

Contact: luigi.calamari@unicatt.it

A study during the summer season evaluated the effect of different cooling systems of resting area on behavioural and productive responses of Italian Friesian dairy cows kept in an experimental free-stall barn located in Piacenza province. The study involved 30 lactating dairy cows subdivided into two groups, homogenous for calving number, parities, and milk yield, and kept in two pens with external paddock. A deep-bedded sand, consisted of about 20 cm of fine sand, was used in the resting area of both pens. The same cooling system was applied in the feeding area in both pens, and a different cooling system in the resting area was applied to the two pens. In one pen the simple ventilation (SV) was applied by using two fans (one for each free-stall row) switched on at 25 °C. In the other pen the ventilation was combined with misting (SW) by using three misters (delivery rate of 26 L/h) switched on at 27 °C (working time of 60 s every 2 min).

Temperature and relative humidity indoor were continuously recorded in the two pens. Breathing rate, rectal temperature, milk yield, and milk characteristics (fat, protein, and somatic cell count) were measured. Behavioural activities (standing and lying cows in the different areas, as well as the animals in the feed bunk) were recorded. The data were processed using analysis of variance. Mild to moderate heat waves during the trial were observed. On average, the breathing rate was greater (not significant) in SV compared with SW cows (60.2 and 55.8 breath/min, respectively), and mean rectal temperature remained below 39 °C in both groups during the trial (on average 38.7 and 38.8 °C in SV and SW, respectively). During the hotter periods of the trial, the time spent lying indoor in the resting area was greater in SW (11.8 h/day) than SV (10.7 h/day), with significant differences ( $p < .05$ ) during evening and night. Considering the time spent outdoor by the cows, mainly lying during evening and night, the total lying time was 14.6 h/day in cows of both treatments. The time spent standing indoor without feeding was 3.8 and 4.3 h/day in SW and SV, respectively, with significant differences ( $p < .05$ ) during evening and night. Milk yield was better maintained during hotter period in SW compared with SV, with a slightly greater somatic cell count in the former. In conclusion, the adoption of the cooling system by means of evaporative cooling also in the resting area reduces the alteration of time budget caused by heat stress.

## P061

### Towards a sustainable wool chain in Apulia: dream or possible reality?

Elena Ciani<sup>1</sup>, Ferruccio Petazzi<sup>2</sup>, Paolo Dorenzo<sup>2</sup>, Nicola Dibenedetto<sup>3</sup>, Luigi Tortorelli<sup>3</sup>, Cristoforo Carrino<sup>4</sup>, Maria C. Rizzo<sup>5</sup>, Giorgio Donnini<sup>6</sup>, Fabio Modesti<sup>7</sup>, Filippo Clemente<sup>8</sup>, Elisa Pieragostini<sup>2</sup>

<sup>1</sup>Dipartimento di Bioscienze, Biotecnologie e

Biofarmaceutica, University of Bari Aldo Moro, Italy

<sup>2</sup>Dipartimento di Emergenza e Trapianti di Organi,

University of Bari Aldo Moro, Italy

<sup>3</sup>Consorzio Murgia Viva, Altamura, Italy

<sup>4</sup>Società Agricola F.lli Carrino, Lucera, Italy

<sup>5</sup>Fondazione Le Costantine, Uggiano La Chiesa, Italy

<sup>6</sup>Associazione Regionale Allevatori – Puglia, Italy

<sup>7</sup>Parco Nazionale dell'Alta Murgia, Bari, Italy

<sup>8</sup>Associazione Pecore Attive, Altamura, Italy

Contact: elena.ciani@uniba.it

Apulia is a region in Southern Italy with traditional vocation for sheep breeding, homeland of the fine-wool endangered-maintained Gentile di Puglia sheep breed. The region currently counts 53945 heads, mainly open-fleece, coarse-wool, pure- or cross- bred animals. In the past decades, sheep wool has lost most of its commercial value; wool price is usually