

## Association of Temperature Factors with Seropositive Results against Selected Pathogens in Dairy Cow Herds from Central and Northern Greece

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**Abstract :** Fertility of dairy cattle can be affected by heat stress when the ambient temperature increases above 30°C and the relative humidity ranges from 35% to 50%. The present study was conducted on dairy cattle farms during summer months in Greece and aimed to identify the serological profile against pathogens that could affect fertility and to associate the positive serological results at herd level with temperature factors. A total of 323 serum samples were collected from clinically healthy dairy cows of 8 herds, located in Central and Northern Greece. ELISA tests were performed to detect antibodies against selected pathogens that affect fertility, namely *Chlamydia abortus*, *Coxiella burnetii*, *Neospora caninum*, *Toxoplasma gondii* and Infectious Bovine Rhinotracheitis Virus (IBRV). Eleven climatic variables were derived from the WorldClim version 1.4. and ArcGIS V.10.1 software was used for analysis of the spatial information. Five different MaxEnt models were applied to associate the temperature variables with the locations of seropositive *Chl. abortus*, *C. burnetii*, *N. caninum*, *T. gondii* and IBRV herds (one for each pathogen). The logistic outputs were used for the interpretation of the results. ROC analyses were performed to evaluate the goodness of fit of the models' predictions. Jackknife tests were used to identify the variables with a substantial contribution to each model. The seropositivity rates of pathogens varied among the 8 herds (0.85-4.76% for *Chl. abortus*, 4.76-62.71% for *N. caninum*, 3.8-43.47% for *C. burnetii*, 4.76-39.28% for *T. gondii* and 47.83-78.57% for IBRV). The variables of annual temperature range, mean diurnal range and maximum temperature of the warmest month gave a contribution to all five models. The regularized training gains, the training AUCs and the unregularized training gains were estimated. The mean diurnal range gave the highest gain when used in isolation and decreased the gain the most when it was omitted in the two models for seropositive *Chl. abortus* and IBRV herds. The annual temperature range increased the gain when used alone and decreased the gain the most when it was omitted in the models for seropositive *C. burnetii*, *N. caninum* and *T. gondii* herds. In conclusion, antibodies against *Chl. abortus*, *C. burnetii*, *N. caninum*, *T. gondii* and IBRV were detected in most herds suggesting circulation of pathogens that could cause infertility. The results of the spatial analyses demonstrated that the annual temperature range, mean diurnal range and maximum temperature of the warmest month could affect positively the possible pathogens' presence. Acknowledgment: This research has been co-financed by the European Regional Development Fund of the European Union and Greek national funds through the Operational Program Competitiveness, Entrepreneurship and Innovation, under the call RESEARCH-CREATE-INNOVATE (project code: T1EDK-01078).

**Keywords :** dairy cows, seropositivity, spatial analysis, temperature factors

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