INFLUENCE OF CLIMATE CHANGES IN ATMOSPHERIC AIR TEMPERATURE ON THE VITAL ACTIVITY OF BEES

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Abstract

The purpose of this work was to reveal the impact of climatic changes in atmospheric air temperature on the vital activity of bee colonies. To elucidate this impact, Pearson's linear correlation coefficients were calculated between the average monthly temperature of the atmospheric air and the average annual value of each of the 6 main morpho-productive characters of the bee families, such as: queen prolificacy, winter resistance, colony strength and disease resistance, brood viability and honey production. The scientific research was carried out on the families of Apis mellifera bees from the Carpathian race at the experimental apiary of the Institute of Zoology of the Academy of Sciences of Moldova. The average monthly and annual data of the atmospheric air temperature for the last 11 years (2010-2020) from the nearest hydrometeorological station, located at a distance of 27 km from the apiary, were used for the research. During this period, for each individual month, Pearson's linear correlation coefficients were calculated between the average monthly temperature of the atmospheric air and the average value per hive of each of the 6 main morpho-productive characters of bee families, such as: prolificacy of queens, winter hardiness, colony strength and disease resistance, brood viability and honey production. The results of the research demonstrated that the winter resistance of the bee colonies is positively influenced by the atmospheric air temperature from October of last year and from January of the current year (r_{xy} = 0.768 and 0.469). At the same time, the high temperatures of the atmospheric air in the months of July, August and September have a negative influence on the winter resistance of bee families (r_{xy} = -0.479; -0.699 and -0.494). The prolificacy of queens is positively influenced only by January temperatures (r_{xy} = 0.464). High atmospheric air temperatures in February, April and June have a negative impact on the prolificacy of queens (r_{xy} = -0.594; -0.795; -0.691). High temperatures in the second half of the year, especially in the months of July and September, negatively influence the prolificacy of queens the following year (r_{xy} = -0.531; -0.711). The strength of bee families is negatively influenced by the atmospheric air temperatures in April and June (r_{xy} = -0.603; -0.691). The high temperatures in September have a negative impact (r_{xy} = -0.606), and those in October have a positive impact (r_{xy} =0.517) on the strength of the colony the following year. Air temperatures in January and February have a positive influence (r_{xy} = 0.495; 0.511), and those in May have a negative influence (r_{xy} = -0.548) on the viability of the bee brood. Overall, the average annual air temperature has a positive influence on brood viability (r_{xy} = 0.833). Honey production is positively influenced by the atmospheric air temperature in January (r_{xy} = 0.488) and negatively – by the atmospheric air temperature in June (r_{xy} = -0.497). At the same time, the atmospheric air temperatures in July and September have a negative impact (r_{xy} = -0.548; -0.684), and those in October – a positive impact (r_{xy} = 0.513) on the honey production of the bee families in the following year.

Key words: *climate changes, air temperature, vital activity, bees*