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Update and Future Plans for the Honeybee Mortality Risk Map in Honey Plant Distribution Areas

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With climate change and environmental degradation increasingly threatening honeybee populations and contributing to Colony Collapse Disorder (CCD), scientific research has become essential to ensuring the sustainability of the beekeeping industry. This study aims to analyze honeybee mortality risk factors in honey plant distribution areas and propose strategies to strengthen the sustainability of apiculture by identifying safe and high-risk zones.

To achieve this, we utilized the nationwide honey plant distribution map established in 2023, incorporating nectar yield grading information and smart beekeeping data to examine the correlations between various factors contributing to honeybee mortality. Our analysis identified the lowest winter temperature—when honeybee activity is at its lowest—as a key variable. Additionally, we selected areas within 100 meters of nectarous trees, based on forest big data exchange records concerning road proximity and mountainous area usage. High-risk zones were further refined by incorporating pest monitoring indices.

Furthermore, the impact of pesticides used in agricultural crop cultivation, a critical issue in bee mortality, was considered. To assess this, we extracted paddy field and orchard data from the Ministry of Environment's 2023 land cover map, analyzing areas within 100 meters of these agricultural zones. Based on these findings, we will update the real-time honeybee mortality monitoring system and implement early warning alerts to inform beekeepers and policymakers of high-risk areas.

Looking ahead, we plan to integrate high-resolution predictive meteorological data to generate an enhanced risk forecast map. These efforts are expected to contribute to increased productivity in the beekeeping industry and the advancement of climate-smart apiculture management.