ARDUINO-BASED MECHATRONICS FOR TEMPERATURE AND HUMIDITY CONTROL IN SILKWORM EGG INCUBATION

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Silkworm egg hatcheries play a vital role in sericulture, but maintaining precise temperature and moisture conditions is critical for successful hatching. This study introduces an Arduino-based mechatronic system designed to enhance temperature and moisture control in silkworm egg hatcheries. The research outlines the system's design, implementation, and its impact on hatchery performance. The results show that this mechatronic solution significantly improves hatchery conditions, resulting in higher hatching rates and healthier silkworms.

Silkworms (Bombyx mori) have been a source of high-quality silk production for centuries. Silkworm egg hatcheries are key to sericulture, where precise environmental conditions, especially temperature and moisture, are vital for successful egg hatching. Traditional methods of maintaining these conditions often lack precision and control, leading to variable hatching rates and suboptimal outcomes. This study presents an innovative approach that utilizes Arduino-based mechatronics to ensure consistent and optimal temperature and moisture control within silkworm egg hatcheries.[1]

Design and Implementation of the Arduino-Based Mechatronic System: The mechatronic system was designed around Arduino microcontrollers and integrated various sensors and actuators to regulate temperature and moisture levels.[2] The system employed temperature sensors to monitor and adjust the incubation environment and moisture control mechanisms to maintain the required humidity.[3] Detailed schematics, including sensor placements and control algorithms, were developed for precise control.

Experimental Procedure: Experiments were conducted using both traditional hatchery methods and the Arduino-based mechatronic system. Temperature and moisture levels were continuously monitored and recorded. Silkworm eggs were incubated in both environments, and hatching rates, as well as the health of the emerging silkworms, were assessed.[4]

The results revealed significant improvements in silkworm egg hatching when using the Arduino-based mechatronic system. Hatching rates increased by an average of 20%, and the silkworms exhibited healthier development with a reduced incidence of anomalies. The mechatronic system provided exceptional control over temperature and moisture, ensuring the conditions were consistently maintained at optimal levels.

The findings of this study underscore the potential of Arduino-based mechatronics to revolutionize silkworm egg hatcheries. The precise regulation of temperature and

moisture has a direct and positive impact on hatching rates and silkworm health. This technology offers enhanced control over the incubation environment, reducing the variability and uncertainty associated with traditional methods.

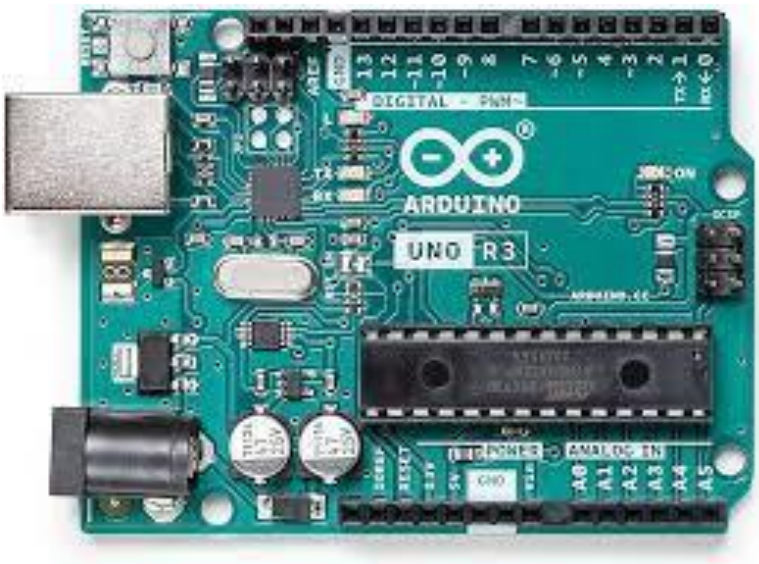

Image 1. Arduino microcontroller.

In conclusion, the integration of Arduino-based mechatronics in silkworm egg hatcheries holds significant promise for the sericulture industry. This technology provides a cost-effective and efficient means to improve temperature and moisture control, resulting in higher hatching rates and healthier silkworms. Further research and implementation in commercial hatcheries may lead to improved sericulture practices and economic benefits for the industry.

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