A Silk Sheath Production Frame Developed from Negative Geotropic Spinning Behavior of Silkworms Resulted in Silk Sheath with High Homogeneity

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Silk sheath homogeneity is essential for the quality of silk sheath. Farmers try to increase silk homogeneity by hand distribution of silkworms on the horizontal frames. We tried to develop a method to increase silk sheath homogeneity by observing the spinning behavior of the worms. We observed that silkworms on a tilted frame always moved upwards. We started an experiment placing the fifth instar larva of silkworms at the top, middle and bottom of a 45° tilted frame. We found that all silkworms showed negative geotropism spinning, spinning silk while moving upwards. We further investigated the homogeneity of silk sheath obtained from silkworms moving on frames tilted at different angles. Each 61 fifth instar larva of silkworms were transferred to the 20 x 30 cm frame angle of 0,15,30,45 and 60 degrees. The number of silkworm dropped from the frame was counted and the qualities of the silk sheath were analyzed. We found that the silk sheath obtained from 45° frame angle showed golden yellow color, highest silk weight per area, good homogeneity of silk and only a few silkworms dropped from the frame. The quality of the silk sheath and the cost of silk sheath production from our equipment were compared to the horizontal frame. The silk sheath produced from the tilted frame had higher homogeneity than the control. This method saved the labor to hand distribute the silkworms on the flat frame and reduced the risk of injuring them.

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