Abstract

Historical weather data from 84 sites in Japan were used to estimate the number of hours ≤ 15°C from 1 September to 31 October, based on the individual years from 1994 to1999, to evaluate the potential for using aeration at a threshold level of 15°C to cool rough rice stored during autumn. The number of hours ≤15°C in September and October ranged from 68±21 in Kyushu to 1067±27 h in northern Hokkaido. At an airflow rate of 0.0013 $m^3/s/m^3$, the time required to cool a storage silo containing rough rice to 15°C ranged from 85 days in southern Japan to 5 days in northern Japan. Weather data for the same sites were also used to estimate the number of hours below ≤15°C from 1 May to 30 September, to evaluate the potential of Sitophilus zeamais Motschulsky, the maize weevil, to infest bagged milled rice at ambient or uncontrolled temperatures. The number of hours 15°C from 1 May to 30 September ranged from 33±15 h in Kyushu to 2392±130 h on the northeastern coast of Hokkaido. As temperature decreased, there was a predicted increase in the number of days required to complete a generation, and as relative humidity increased, a predicted increase in the number of generations that could be produced. These simulation studies show how historical weather data can be used to develop risk management models for storage of bulk rough rice and bagged milled rice in Japan. Aeration during autumn could be used to cool large-bulk storage silos containing rough rice, while the simulations for development of *Sitophilus zeamais* populations on bagged milled rice emphasize the importance of insect management strategies for value-added products.