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Improving food and feed production by utilizing insects fed with food and feed wastes

We aim to solve the problems associated with global food shortage by integrating domestic and international efforts that advance technologies for insect production. This project should be super-accelerated by gathering wisdom across generations with innovative minds from academic, industrial and governmental sectors. We will promote complementary and synergistic interdisciplinary collaboration and realize social innovation by launching start-up businesses. We aim to build a closed-cycle food production platform that will ensure humanity's unprecedented growth.

Development of Insect-Based Sustainable Food Production Systems for Global Food Security and Human Space Exploration

Keywords: insect domestication, multiomics, highly functional food, fishmeal substitute feed material, fishery environmental management, space food production

Background

Insects have potential for solving the protein crisis

The current pace of worldwide population growth will imminently face a protein crisis, a situation in which the demand for dietary protein exceeds the supply. Insects have garnered considerable attention as new protein sources with low environmental impact. We will solve the protein crisis through the development of a sustainable mass production system of high-quality insects for human food and animal feed.

Research Contents

Food production based on waste-recycling insect feed

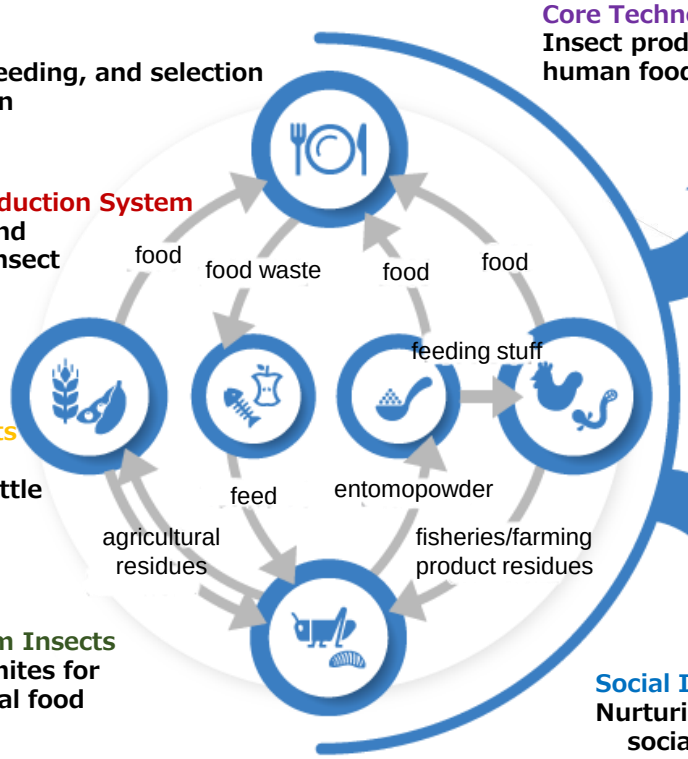
This project will develop insects that can convert crop residues and food wastes, among other sources, into useful proteins and introduce them as raw materials for marine and livestock feed by 2030. The insects are utilized as a new biological resource to support human food, health, and the global environment. The project will develop insect production systems available to any environment on Earth by 2040. Furthermore, we aim to advance to closed-cycle food production platforms that provide safe, secure and healthy food even in space by 2050.

Insect Breeding
Genome editing, breeding, and selection for insect production

Sustainable Insect Production System
Development of safe and environment friendly insect production systems

Feed for Fishery and Farming from Insects
Insects for the next-generation feed for cattle and aquaculture that replace fish meal

Food Derived from Insects
Crickets and Termites for safe and functional food



Core Technology Development for Space
Insect production system for human food in space

Social Implementation
Nurturing and construction of socially acceptable new industries

Targets by 2030

By 2030, we aim to achieve the following targets:

(1) Establish production package of crickets, fish feed from black soldier flies, and poultry feed from termites.

(2) Establish a sustainable mass production system for high-quality insects.

To achieve these goals, the following actions will be implemented taken in fiscal year 2022

(1) Development of feed management and evaluation of nutrition for "cricket feeding standards."

(2) Breeding of superior traits in black soldier flies, and evaluation of test feed for fish farming.

(3) Functional investigation of termites as animal feed.

Cooperating Research Institutes

Ochanomizu University, Tokyo University of Agriculture and Technology, Tokushima University, Nagahama Institute of Bio-Science and Technology, Waseda University, Fisheries Research and Education Agency, National Agriculture and Food Research Organization, University of Human Environments, RIKEN, Tokyo University of Marine Science and Technology, University of Tokyo, Shizuoka Prefectural Research Institute of Fishery, Kyoto University, Yamaguchi University, Hamamatsu University School of Medicine