

Academic Prizes and Awards

2013 NISTEP Award (also known as “The Researchers with Nice Step”): Development of a method for global crop yield prediction at three months before the harvest”

Researcher: Toshichika Iizumi

Dr. Toshichika Iizumi, a Researcher at the Agro-Meteorology Division, won the 2013 NISTEP Award. The National Institute of Science and Technology Policy (NISTEP), Ministry of Education, Culture, Sports, Science and Technology (MEXT), gives this award to selected scientists who have achieved significant contributions to science and technology (S&T). Since 2005, about 10 scientists across all disciplines of S&T have been selected every year for this prize, including Prof. Shinya Yamanaka who is a winner of 2012 Nobel Prize in Physiology or Medicine (he won NISTEP Prize in 2006). In this case, the prize recognizes Dr. Iizumi’s significant research outcomes as a young scientist.

Dr. Iizumi and his colleagues found that, in about 20% of the global harvested area, rice and wheat production are reliably predictable at three months before the harvest using ensemble seasonal climatic forecasts and statistical crop models. The reliabilities of estimates varied substantially by crop. The reasons for variation in the reliability of the estimates included the differences in crop sensitivity to the climate and the technology used by the crop-producing regions (e.g., irrigation). Given the increased dependency of consumers, including poor, on food imports, national governments and commercial entities in food-importing countries are therefore paying increased attention to the cropping forecasts of important food-exporting countries as well as to their own domestic food production. These findings demonstrate the usefulness of seasonal climatic forecasts in predicting crop failures and will encourage the adaptation of food systems to climatic extremes under changing climate.

2013 (Sixth) NIAES Young Researcher Encouragement Awards

To stimulate younger researchers at our institution, this award is presented to those researchers and research fellows (post-doctoral researchers) under age 40 and employed at the National Institute for Agro-Environmental Sciences, who have conducted particularly outstanding research. The award ceremony and speeches by recipients were held on December 5.

Researchers:

Research on Insect Sex Pheromones and Other
Semiochemicals

Biodiversity Division, Jun Tabata, Senior Researcher



Humans chiefly use language (sounds) to communicate, but other organisms often use chemicals to exchange information. For example, the sex pheromones secreted by female moths to attract males are semiochemicals that send a message by means of smell. I am conducting research to reveal the chemical structures and functions of such substances, and the mechanisms behind their production and reception. I hope to use them as biologically derived techniques to prevent insect damage with a low environmental burden.

Research on Simple, Quick and Versatile Residual Crop Pesticide Analysis Methods

Organochemicals Division, Eiki Watanabe, Senior
Researcher



Pre-shipment tests and other inspections for residual pesticide analyses are performed to assure agricultural crop safety. Requirements for analysis methods used in such situations are simplicity and rapidity, as well as versatility and economy. In consideration of the global environment and working environments of those performing the analyses, it is also important to minimize

the use of hazardous organic solvents. To fulfill these conditions, I developed an analysis method that uses water to extract water-soluble pesticides, and reduced the amounts of organic solvents used for analyses.

Research Fellows

Elucidating Molecular Mechanisms to Reduce Concentrations of Arsenic and Cadmium in Crops
Soil Environment Division, Masato Kuramata, NIAES Research Fellow



Rice accounts for a high proportion of the cadmium and arsenic that the Japanese ingest from food. I therefore endeavored to elucidate the mechanism by which rice plants absorb these heavy metals. For cadmium, I identified the absorption gene and developed a DNA marker for it. For arsenic, based on studies of arsenic metabolism by rice plant rhizosphere bacteria, I identified the arsenic methylation gene and discovered a new arsenic compound. My research found that arsenic exists

in various forms in the rice plant rhizosphere, and that the factors influencing arsenic absorption by rice plants were unexpectedly complex.

Research on Using Calcium Cyanamide to Reduce the Nitrous Oxide Emitted from Farmland
Carbon and Nutrient Cycles Division, Akinori Yamamoto, NIAES Research Fellow



The largest source of the powerful greenhouse gas nitrous oxide is agriculture; the reduction of these emissions by agriculture is a major challenge. I therefore explored techniques using calcium cyanamide, a chemical that is distinguished by its effectiveness both as an agricultural chemical and fertilizer, to reduce nitrous oxide emissions from farmland. I found that for tea plantations and poorly drained upland fields converted from rice paddies, use of calcium cyanamide can reduce nitrous oxide emissions compared to ordinary chemical fertilizers.