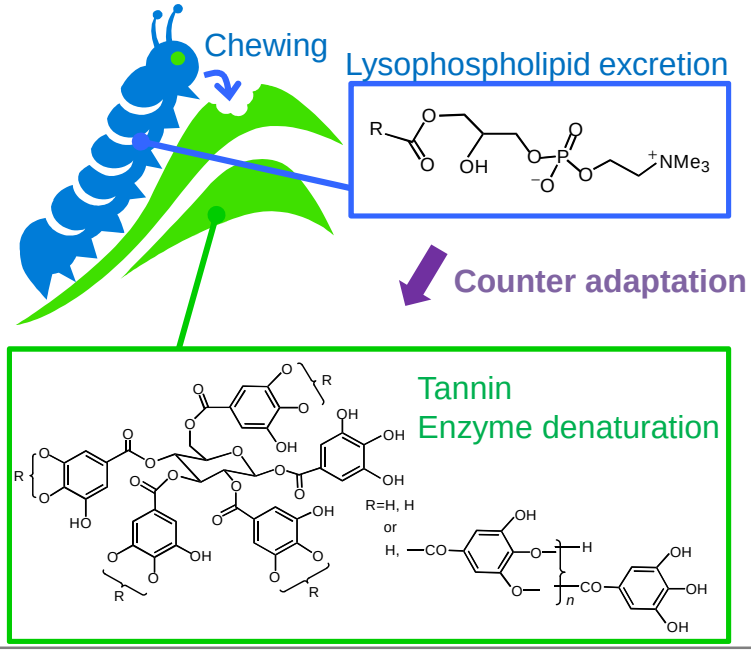
Research Introduction

Faculty of Agriculture, Yamagata University

Plant-insect interaction

What we did …



Tannins are defensive molecules occurring widely in plants. Dietary tannin may bind digestive enzymes of herbivores and affect them by reducing digestibility. In lepidopteran caterpillars, lysophosphatidylcholine (lysoPC), known as surfactants present in the guts, are thought to interfere with tannin-protein interactions. However, details of biosynthetic pathways of lysoPC in caterpillars have not been paid attention. We investigated biosyntheses of lysoPC in *Spodoptera litura* larvae by using ^{13}C labeled linolenic acid. Linolenic acid was incorporated into phospholipids in gut tissues and then the biosynthesized phospholipids were released to the gut lumen, and then some of diacylPC were hydrolyzed to lysoPC in the gut lumen.

Publications

2015

Yan J, Aboshi T, Teraishi M, Strickler SR, Spindel JE, Tung CW, Nakata R, Matsumoto F, Maesaka Y, McCouch SR, Okumoto Y, Mori N, Jander G. 2015 The Tyrosine Aminomutase TAM1 Is Required for β-Tyrosine Biosynthesis in Rice. *The Plant Cell.* 27:1265-78

Yoshitake Y, Yokoo T, Saito H, Tsukiyama T, Quan X, Zikihara K, Katsura H, Tokutomi S, Aboshi T, Mori N, Inoue H, Nishida H, Kohchi T, Teraishi M, Okumoto Y, Tanisaka T. 2015 The effects of phytochrome-mediated light signals on the developmental acquisition of photoperiod sensitivity in rice. *Sci Rep.* 5:7709

2014

Aboshi T, Ishida M, Matsushita K, Hirano Y, Nishida R, Mori N. Stage-specific quercetin sulfation in the gut of *Mythimna separata* larvae (Lepidoptera: Noctuidae). 2014 *Biosci Biotechnol Biochem.* 78:38-40

Murakami S, Nakata R, Aboshi T, Yoshinaga N, Teraishi M, Okumoto Y, Ishihara A, Morisaka H, Huffaker A, Schmelz EA, Mori N. Insect-induced daidzein, formononetin and their conjugates in soybean leaves. 2014 *Metabolites.* 4:532-46

2013

Aboshi T, Shimizu N, Nakajima Y, Honda Y, Kuwahara Y, Amano H, Mori N. Biosynthesis of linoleic acid in Tyrophagus mites (Acarina: Acaridae). 2013 *Insect Biochem Mol Biol.* 43:991-6

2012

Aboshi T, Yoshinaga N, Nishida R, Mori N. Phospholipid biosynthesis in the gut of *Spodoptera litura* larvae and effects of tannic acid ingestion. *Insect Biochem Mol Biol*. 40:325-30

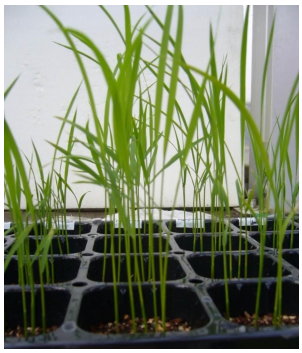
and more

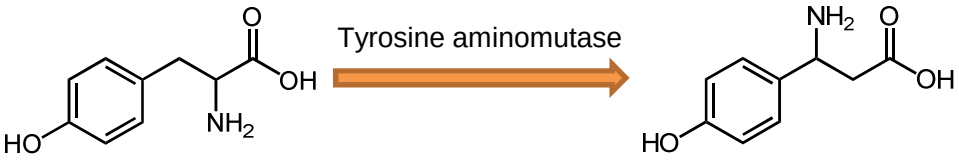
Hope For The Future

What we do now

β-Tyrosine accumulation by jasmonic acid in rice

Rice is one of the most important crop in the world. We focus on the chemical defense system of rice. We found a non protein amino acid, β-tyrosine, is accumulated in rice plants by jasmonic acid. We analyzed 119 diverse cultivar from a Japanese rice collection and world rice collection of NIAS Genebank and found that β-tyrosine was most prevalent in temperate japonica cultivars.





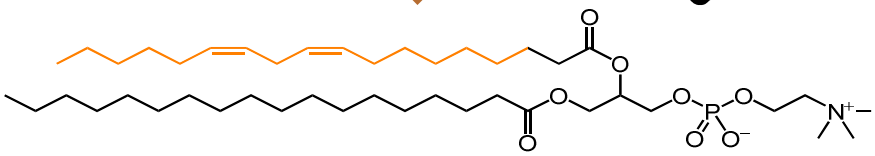
α-Tyrosine　　β-Tyrosine

Linolenic acid biosynthesis in Tyrophagus mites

Tyrophagus mites are pests of store food products and they show the unique physiological capabilities. We focus broadly on the biochemical bases for their unique metabolism. We found that *Tyrophagus similis* and *Tyrophagus putrescentiae* (Astigmata: Acaridae) have the ability to biosynthesize linoleic acid [(9Z, 12Z)-9, 12-octadecadienoic acid] via a Δ12-desaturation step, although animals in general and vertebrates in particular appear to lack this ability.

Palmitic acid (C16:0)

Phosphatidylcholine containing linoleate (C18:2)



Belongings: Development of Food, Life and Environmental Science
Plant and Bioresource Science Course
Research Field: Bioorganic chemistry, Chemical Ecology
Self Introduction: Ph.D., 2011 Agriculture (Kyoto University)
M.S., 2008 Agriculture (Kyoto University)
Phone: +81-235-282867
Email: taboshi@tds1.tr.yamagata-u.ac.jp