

# Program of the 12th annual meeting

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## Oral presentation

### **001. Global analysis of gene expression of *Mesorhizobium loti* under symbiosis and starvation**

Y. Oowada<sup>1</sup>, K. Minamisawa<sup>2</sup>, H. Mitsui<sup>2</sup>, M. Itakura<sup>2</sup>, N. Nukui<sup>2</sup>, P. Dawadi<sup>2</sup>, S. Tabata<sup>3</sup>, T. Kaneko<sup>3</sup>, T. Yokoyama<sup>4</sup>, K. Terajima<sup>4</sup>, K. Saeki<sup>5</sup>, H. Oomori<sup>5</sup>, Y. Murooka<sup>6</sup>, M. Hayashi<sup>6</sup>, S. Tajima<sup>7</sup>, M. Nomura<sup>7</sup>, K. Shimoyama<sup>7</sup>, M. Abe<sup>8</sup>, T. Uchiumi<sup>8</sup>, A. Suzuki<sup>8</sup> and Y. Shimoda<sup>8</sup> (1Department of Agricultural and Life Sciences, Obihiro University of Agriculture and Veterinary Medicine, 2Graduate School of Life Sciences, Tohoku University, 3Kazusa DNA Research Institute, 4Tokyo University of Agriculture and Technology, 5Department of Biology Graduate School of Science, Osaka University, 6Department of Biotechnology, Graduate School of Engineering, Osaka University, 7Department of Life Science, Kagawa University, 8Department of Chemistry and BioScience)

### **002. Genome sequence analysis of *Bradyrhizobium japonicum***

Takakazu Kaneko, Yasukazu Nakamura, Shusei Sato and Satoshi Tabata (Kazusa DNA Research Institute)

### **003. Rhizobial sigma factor RpoH**

Hisayuki Mitsui, Yoshikatsu Sato and Kiwamu Minamisawa (Graduate School of Life Sciences, Tohoku University)

### **004. Expression of symbiotic function encoded by pSym on *Rhizobium- Agrobacterium* transconjugants**

Hiroki Nakatsukasa, Toshiki Uchiumi, Akihiro Suzuki, Shiro Higashi and Mikiko Abe (Graduate School of Science and Engineering, Kagoshima University)

### **005. Function and regulation of rhizobitoxine biosynthesis gene *rtxA* in *Bradyrhizobium elkanii***

Masayuki Sugawara, Shin Okazaki, Hisayuki Mitsui and Kiwamu Minamisawa (Graduate School of Life Sciences, Tohoku University)

### **006. Nodulation of transgenic *Lotus japonicus* with heterologous ethylene receptor gene**

Noriyuki Nukui, Hiroshi Ezura and Kiwamu Minamisawa (Graduate School of Life Sciences, Tohoku University)

### **007. Bioremediation system for heavy metals using the symbiosys between a leguminous plant and getically engineered rhizobia**

Yoshikatsu Murooka<sup>1</sup>, Sriprang Rutchadaporn<sup>2</sup> and Makoto Hayashi<sup>2</sup> (1Dept. Bioinf., Grad. School Inform., Osaka Univ., 2Dept. Biotech., Grad. School Eng., Osaka Univ.)

### **008. Construction of saturation map and BAC contig around *Ljsym72*, indispensable for both Rhizobia and arbuscular mychorriza symbiotic interactions**

Haruko Imaizumi-Anraku<sup>1</sup>, Yasuhiro Murakami<sup>1</sup>, Satoko Yoshida<sup>2</sup>, Martin Parniske<sup>2</sup>, Shusei Sato<sup>3</sup>, Satoshi Tabata<sup>3</sup>, Masayoshi Kawaguchi<sup>4</sup> and Shinji Kawasaki<sup>1</sup> (1National Institute of Agrobiological Sciences, 2The Sainsbury Laboratory, John Innes Centre, 3Kazusa DNA Research Institute, 4Dept. Env. Sci., Fac. Sci., Niigata Univ.)

### **009. Physical mapping of the *LjSym70* controlling the initial step of nodulation of *Lotus japonicus***

Yasuhiro Murakami<sup>1</sup>, Haruko Imaizumi-Anraku<sup>1</sup>, Xinwang Wang<sup>1</sup>, Masayoshi Kawaguchi<sup>2</sup> and Shinji Kawasaki<sup>1</sup> (1National Institute of Agrobiological Science, 2Dept. Env. Sci., Fac. Sci., Niigata Univ.)

**010. Molecular identification of genes conferring hypernodulation in *Lotus japonicus* and *Glycine max***

Rieko Nishimura<sup>1</sup>, Masaki Hayashi<sup>2</sup>, Guo-Jiang Wu<sup>3</sup>, Hiroshi Kouchi<sup>3</sup>, Yasuhiro Murakami<sup>3</sup>, Haruko Imaizumi-Anraku<sup>3</sup>, Shinji Kawasaki<sup>3</sup>, Shoichiro Akao<sup>3</sup>, Masayuki Ohmori<sup>1</sup>, Mamoru Nagasawa<sup>2</sup>, Kyuya Harada<sup>2</sup> and Masayoshi Kawaguchi<sup>4</sup> (1Univ. of Tokyo, 2Chiba Univ., 3National Inst. Agrobio. Sci., 4Niigata Univ.)

**011. Transformation of super root of *Lotus corniculatus***

Yasuyo Kutsuna, Masatugu Hashiguchi and Ryo Akashi (Faculty of Agriculture, Miyazaki University)

**012. Isolation of Endophytic Bacteria from Sweetpotato and Enhancement of Nitrogen-fixation of Diazotrophs by Coculture with Nonnitrogen-fixing Isolates**

Constancio A. Asis, Jr. and Katsuki Adachi (Department of Upland Farming Research, National Agricultural Research Center for Kyushu Okinawa Region (KONARC))

**013. Nitrogen Fixation by Sugarcane Endophyte**

Atsushi Momose<sup>2</sup>, Keiko Nishimura<sup>1</sup>, Takahiro Hiyama<sup>1</sup>, Noriko Ishizaki<sup>1</sup>, Norikuni Ohtake<sup>1</sup>, Kuni Sueyoshi<sup>1</sup>, Yasuhiro Nakanishi<sup>3</sup>, Syoichiro Akao<sup>4</sup> and Takuji Ohyama<sup>1</sup> (1Facul. Agric., Niigata Univ., 2Graduate School of Sci. Tech., Niigata Univ., 3Tokyo Univ. Agric., 4Facul. Agric., Miyazaki Univ.)

**014. Change of poly P content in host plant roots during the colonization of arbuscular mycorrhizal fungi**

Ryo Ohtomo and Masanori Saito (National Institute of Livestock & Grassland Science)

**015. Specific phospholipid fatty acid to identify and quantify the external hyphae of the arbuscular mycorrhizal fungus *Gigaspora rosea***

Kazunori Sakamoto, Tomomi Iijima and Ryu Higuchi (Faculty of Horticulture, Chiba University)

**016.  $\beta$ -Phenethylamine formation in adzuki bean root nodules**

Shinsuke Fujihara<sup>1</sup>, Junko Terakado<sup>1</sup>, 2 and Naoyoshi Nishibori<sup>3</sup> (1National Agricultural Research Center, 2Japan Society for the Promotion Science, 3Shikoku University)

**017. Recognition of pathogen signals and defense signaling: Role of cell wall-bound apyrase in defense signaling and its regulation by pathogen signal molecules**

H. Takahashi<sup>1</sup>, Y. Hirakawa<sup>2</sup>, K. Morishita<sup>3</sup>, H. Yamashita<sup>1</sup>, T. Kawahara<sup>1</sup>, K. Yoshioka<sup>1</sup>, K. Toyoda<sup>1</sup>, Y. Inagaki<sup>1</sup>, M. Yamamoto<sup>1</sup>, Y. Ichinose<sup>1</sup> and T. Shiraishi<sup>1</sup> (1Laboratory of Plant Pathology & Genetic Engineering, Faculty of Agriculture, Okayama University, 2Nishikawa Rubber CO., Ltd., 3Wako Pure Chemical Industries, Ltd.)

**018. RiCDPK1 and RiCDPK2, the calcium-dependent protein kinase of potato, is localized to the plasma membrane, where they activate the HWC elicitor and suppressor signalling pathway of *Phytophthora infestans***

N. Furuichi<sup>1</sup>, A. Hassan<sup>1</sup>, M. Oosawa<sup>1</sup>, K. Saitou<sup>2</sup> and Masataka Kinjyo<sup>2</sup> (1School of Science and Technology, Niigata University, 2Institute of Electronics, Hokkaido University)

**019. Signal transduction and cell cycle control during elicitor-induced hypersensitive cell death in tobacco BY-2 cells**

Kazuyuki Kuchitsu, Takashi Watanabe and Yasuhiro Kadota (Dept. of Applied Biological Science/Genome & Drug Research Center, Tokyo University of Science)

**020. Effect of paper pot transfer method and deep placement of nitrogen fertilizer for maximum yield of soybean**

Kaushal Tewari<sup>1</sup>, Taketo Suganuma<sup>2</sup>, Hiroyuki Fujikake<sup>1</sup>, Norikuni Ohtake<sup>2</sup>, Kuni Sueyoshi<sup>2</sup>, Yoshihiko

Takahashi<sup>3</sup> and Takuji Ohyama<sup>2</sup> (1Graduate School of Science and Technology, Niigata University, 2Faculty of Agriculture, Niigata University, 3Niigata Crop Research Center)

**021. Construction and analysis of activation-tagged lines of *Lotus japonicus***

Ryujiro Imaizumi<sup>1</sup>, Nanako Kameya<sup>2</sup>, Ikuo Nakamura<sup>2</sup>, Sin-ichi Ayabe<sup>1</sup> and Toshio Aoki<sup>1</sup> (1Dept. Biol. Appl. Sci., Nihon Univ., 2Grad. Sc. Sci. & Technol., Chiba Univ.)

**022. *Ljsym79*, a symbiotic mutant of *Lotus japonicus* that affects infection thread growth and alters root hair, trichome, and seed development**

Myra Tansengco<sup>1</sup>, Makoto Hayashi<sup>1</sup>, Haruko Imaizumi-Anraku<sup>2</sup>, Masayoshi Kawaguchi<sup>3</sup> and Yoshikatsu Murooka<sup>1</sup> (1Dept. Biotech., Grad. School. Eng., Osaka Univ., 2NIAS, 3Dept. Env. Sci., Fac. Sci., Niigata Univ.)

## Poster Presentation

**P01. Population of Nitrogen-fixing Bacteria in the Apoplast of Wildtype, Cultivated and Relative Species of Sugarcane in Tanegashima Island**

Constancio A. Asis, Jr.<sup>1</sup>, Katsuki Adachi<sup>1</sup>, Akira Sugimoto<sup>2</sup>, Kunihiro Ujihara<sup>2</sup>, Yoshifumi Terajima<sup>2</sup> and Eiji Fukuhara<sup>2</sup> (1Department of Upland Farming Research, KONARC, 2Department of Crop and Food Science, KONARC)

**P02. Mathematical modeling for vertical distribution of nodules in a root system**

Jun-ichi IKEDA (National Agricultural Research Center for Western Region)

**P03. Promotion of seed germination and plant growth by inoculation of root endophytic fungi**

Sagiri Teshima and Kazunori Sakamoto (Graduate School of Science and Technology, Chiba University)

**P04. Glycosylation of flagellin in *Pseudomonas syringae* pv. *glycinea* determines HR-specificity**

K. Takeuchi<sup>1, 2</sup>, F. Taguchi<sup>1</sup>, M. Eguchi<sup>1</sup>, Y. Inagaki<sup>1</sup>, K. Toyoda<sup>1</sup>, T. Shiraishi<sup>1</sup> and Y. Ichinose<sup>1</sup> (1Okayama Univ., 2National Institute of Agrobiological Sciences)

**P05. Three-dimensional analysis of actinorhizal nodule and hemoglobin gene in *Alnus firma***

Fuyuko Sasakura<sup>1</sup>, Norihito Kanamori<sup>2, 3</sup>, Katsumi Takenouchi<sup>1</sup>, Toshiki Uchiumi<sup>1</sup>, Akihiro Suzuki<sup>1</sup>, Shiro Higashi<sup>1</sup>, Hiroshi Oyaizu<sup>2</sup>, Jun-ichi Sugiyama<sup>3</sup> and Mikiko Abe<sup>1</sup> (1Dept. of Chemistry and BioScience, Kagoshima University, 2Dept. Global Agricultural Sciences, The University of Tokyo, 3National food Research Institute)

**P06. Dynamics of Organelles in Pathogenic Proteneaceous Elicitor-Induced Programmed Cell Death in Tobacco Cells**

Eri Nakamura, Tatsuaki Goh, Takashi Watanabe, Yasuhiro Kadota, Katsumi Higashi and Kazuyuki Kuchitsu (Department of Applied Biological Science, Tokyo University of Science)

**P07. Bacterial flora on Leaf Sheaths of Intact Rice Plants**

H. Shinohara, J. Enya, S. Tsushima, S. Yoshida and T. Tsukiboshi (National Institute for Agro-Environmental Sciences)

**P08. Response of Cu/Zn-SOD in pea to pathogenic signal molecules**

T. Kasai, K. Ono, K. Toyoda, Y. Inagaki, M. Yamamoto, Y. Ichinose and T. Shiraishi (Laboratory of Plant Pathology and Genetic Engineering, College of Agriculture, Okayama University)

**P09. Application of improved nitrogen-fixing bacteria to the rice cultivation**

Makoto Hidaka (Graduate School of Agricultural and Life Sciences, The university of Tokyo)

**P10. Characterization of Two Nonsymbiotic globin genes in *Lotus japonicus***

Yoshikazu Shimoda<sup>1</sup>, Toshiki Uchiumi<sup>2</sup>, Akihiro Suzuki<sup>2</sup>, Keishi Senoo<sup>3</sup>, Shusei Sato<sup>4</sup>, Satoshi Tabata<sup>4</sup>, Mikiko Abe<sup>2</sup> and Shiro Higashi<sup>2</sup> (1Graduate School of Science of Engineering, 2Faculty of Science, Kagoshima University, 3Faculty of Bioresources, Mie University, 4Kazusa DNA Research Institute)

**P11. Endophytic colonization of a rice variety for feeding by the nitrogen-fixing bacterium *Herbasprillum* sp. A46**

Rowena H. Oane<sup>1</sup>, Yasuo Ando<sup>1</sup>, Kenji Sato<sup>2</sup>, Ryouji Kobayashi<sup>2</sup> and Ikuo Hattori<sup>2</sup> (1JIRCAS, 2KONARC)

**P12. The efficacy of RNAi in roots and nodules of *Lotus japonicus***

Hirotaaka Kumagai and Hiroshi Kouchi (National Institute of Agrobiological Sciences)

**P13. Accumulation of a sapogenin in the arbuscular mycorrhizas of *Lotus japonicus***

Kohki Akiyama, Akira Nishikawa and Hideo Hayashi (Graduate School of Agriculture and Biological Sciences, Osaka Prefecture University)

**P14. Expression analysis of SNARE-like genes in *Lotus japonicus***

Mai Ha Thu<sup>1</sup>, Yoshihiko Hirashima<sup>1</sup>, Takako Fuke<sup>1</sup>, Erika Asamizu<sup>2</sup>, Satoshi Tabata<sup>2</sup>, Kaoru Takegawa<sup>1</sup>, Mika Nomura<sup>1</sup> and Shigeyuki Tajima<sup>1</sup> (1Faculty of Agriculture, Kagawa university, 2Kazusa DNA Research Institute)

**P15. Identification of genes responsible for the Fix- and Exo- phenotype of *Mesorhizobium loti* mutant *exo22***

Elina Mishima, Haruko Imaizumi-Anraku, Masayoshi Kawaguchi and Kazuhiko Saeki (Grad. Sch. Sci., Osaka Univ. & Grad. Sch. Arts Sci., Univ. Tokyo)

**P16. Comprehensive analysis of gene expression in *Lotus japonicus* root nodules formed with *Rhizobium etli***

Mari Banba<sup>1</sup>, Yasuhiro Ooki<sup>1</sup>, Hiroshi Kouchi<sup>2</sup>, Katsura Izui<sup>1</sup> and Shingo Hata<sup>1</sup> (1Grad. Sch. Biostudies, Kyoto Univ., 2National Institute of Agrobiological Sciences)

**P17. Analysis of *mcp* deletion mutants affecting on nodulation competition with wild type *Sinorhizobium meliloti***

Shintarou Hirase<sup>1</sup>, Yuki Tsunamoto<sup>1</sup>, Tosiyuki Morisita<sup>1</sup>, Ikuyo Gotou<sup>1</sup>, Akira Tabuchi<sup>1</sup>, Birgit Scharf<sup>2</sup>, Paul Muschler<sup>2</sup> and Ruediger Schmitt<sup>2</sup> (1Dept. of Bioscience and Biotechnology, Faculty of Agriculture, Shinshu University, 2 Lehrstuhl fuer Genetik, Universitaet Regensburg)

**P18. Genes for phytoalexin biosynthesis in *Lotus japonicus***

Norimoto Shimada<sup>1</sup>, Tomoyoshi Akashi<sup>1</sup>, Toshio Aoki<sup>1</sup>, Shusei Sato<sup>2</sup>, Yasukazu Nakamura<sup>2</sup>, Satoshi Tabata<sup>2</sup>, Shin-ichi Ayabe<sup>1</sup> (1Department of Applied Biological Sciences, Nihon University, 2 Kazusa DNA Research Institute)

**P19. Structure and function of a Type III secretion system of *Bradyrhizobium japonicum***

Hiroshi Nisizawa<sup>1</sup>, Shin-ichi Aizawa<sup>2</sup> and Kiwamu Minamisawa<sup>1</sup> (1Graduate School of Life Sciences, Tohoku University, 2Department of Biosciences, Teikyo University)

**P20. Involvement of *Lotus japonicus* dihydroflavonol 4-reductase in the biosynthesis of anthocyanin and condensed tannin**

Ryohsuke Sasaki<sup>1</sup>, Norimoto Shimada<sup>1</sup>, Toshio Aoki<sup>1</sup>, Shusei Sato<sup>2</sup>, Yasukazu Nakamura<sup>2</sup>, Satoshi Tabata<sup>2</sup>, Shin-ichi Ayabe<sup>1</sup> (1Department of Applied Biological Sciences, Nihon University, 2Kazusa

**P21. Growth and morphological characteristics of *Frankia* isolated from the root nodules of 4 actinorhizal plants**

Chiharu Tani, Daisuke Katayama and Hideo Sasakawa (Faculty of Agriculture, Okayama University)

**P22. Phosphate solubilizing bacteria as a plant growth promoting rhizobacteria in aluminium-toxic soil**

Dolly Damarjaya Iriani, Keishi Senoo, Masaya Nishiyama, Shigeto Otsuka and Satoshi Matsumoto (Graduate School of Agricultural and Life Sciences, The University of Tokyo)

**P23. Utilization of an ordered overlapping cosmid bank of *Mesorhizobium loti* MAFF303099: construction and some properties of mutants with genome deletions**

Yoshiyuki Hattori<sup>1</sup>, Hirofumi Omori<sup>1</sup>, Noriko Kaseda<sup>1</sup>, Takakazu Kaneko<sup>2</sup>, Satoshi Tabata<sup>2</sup> and Kazuhiko Saeki<sup>1</sup> (1Department of Biology, Graduate School of Science, Osaka university, 2Kazusa DNA Institute)

**P24. Macroarray analysis of *Lotus japonicus* Fix- mutant *sym75***

Norio Suganuma<sup>1</sup>, Atsuko Yamamoto<sup>1</sup>, Takashi Kato<sup>1</sup>, Takeshi Okada<sup>1</sup>, Masayoshi Kawaguchi<sup>2</sup> and Hiroshi Kouchi<sup>3</sup> (1Aichi University of Education, 2Niigata University, 3National Institute of Agrobiological Sciences)

**P25. The effect of glycine betaine on nodulation ability and growth of root nodule bacteria**

Kaori Shimizu<sup>1</sup>, Shun Kubota<sup>1</sup>, Yuko Yoshida<sup>1</sup>, Katsuichi Tsuchida<sup>2</sup>, Tomoyuki Machi<sup>2</sup>, Hideyuki Kaji<sup>2</sup>, Hiroshi Masuda<sup>1</sup> and Takuji Ohwada<sup>1</sup> (1Obihiro University of Agriculture and Veterinary Medicine, 2Tokachi Agricultural Cooperative)

**P26. Phenotypical analysis of early nodulation mutant *Ljsym73***

Makoto Yoshikawa<sup>1</sup>, Takaki Maekawa<sup>1</sup>, Makoto Hayashi<sup>1</sup>, Masayoshi Kawaguchi<sup>2</sup> and Yoshikatsu Murooka<sup>1</sup> (1Dept. Biotech., Grad. School Eng., Osaka Univ., 2Dept. Env. Sci., Fac. Sci., Niigata Univ.)

**P27. Endogenous levels of polyamines in leguminous plants during nodule development**

Junko Terakado<sup>1, 2</sup> and Shinsuke Fujihara<sup>1</sup> (1National Agricultural Research Center, 2Japan Society for the Promotion of Science)

**P28. New mutants of *Lotus japonicus* are involved in nodule development**

Kouji Yano<sup>1</sup>, Makoto Hayashi<sup>1</sup>, Masayoshi Kawaguchi<sup>2</sup> and Yoshikatsu Murooka<sup>1</sup> (1Dept. Biotech., Grad. School Eng., Osaka Univ., 2Dept. Env. Sci., Fac. Sci., Niigata Univ.)

**P29. The present situation of the *Lotus japonicus* seed center**

Sachiko Isobe, Kiyosada Hiroi and Mitsuru Gau (National Agricultural Research Center for Hokkaido Region)

**P30. An attempt for isolation of novel *Lotus japonicus* symbiotic mutants by inoculation of *Rhizobium etli***

Yasuhiro Ooki, Mari Banba, Katsura Izui and Shingo Hata (Grad. Sch. Biostudies, Kyoto Univ.)

**P31. Investigation of the relationship between nitrogen fixation activity of soybean (*Glycine max* L.) nodule and distribution of photosynthetic products using <sup>13</sup>N<sub>2</sub> and <sup>11</sup>CO<sub>2</sub>**

N. Ohtake<sup>1</sup>, K. Sueyoshi<sup>1</sup>, H. Fujikake<sup>2</sup>, S. Ishikawa<sup>2</sup>, A. Osa<sup>3</sup>, M. Koizumi<sup>3</sup>, S. Watanabe<sup>3</sup>, T. Sekine<sup>3</sup>, S. Fujimaki<sup>3</sup>, N. Ishioka<sup>3</sup>, S. Matsunashi<sup>3</sup>, H. Uchida<sup>4</sup>, A. Tsuji<sup>4</sup> and T. Ohyama<sup>1</sup> (1Faculty of Agriculture, Niigata University, 2Graduate School of Sci. Tech., Niigata Univ., 3Department of Radiation Research for Environment and Resources, JAERI, 4Hamamatsu Photonics Co.)

**P32. Symbiotic mutants of *Lotus japonicus* derived from the regenerated plants**

Yosuke Umehara and Hiroshi Kouchi (National Institute of Agrobiological Sciences, Laboratory of Nitrogen Fixation)

**P33. Cloning and expression analysis of NAD- and NADP-malic enzyme genes of *Bradyrhizobium japonicum* USDA110**

Amane Kodera<sup>1</sup>, Suphawat Sinsuwongwat<sup>1</sup>, Takakazu Kaneko<sup>2</sup>, Satoshi Tabata<sup>2</sup>, Mika Nomura<sup>1</sup>, and Shigeyuki Tajima<sup>1</sup> (1Dept.Life Science, Kagawa Univ. 2Kazusa DNA Research Institute)

## **Special Lecture**

**Enhanced resistance to seed-transmitted bacterial diseases in transgenic rice plants overproducing an oat cell-wall-bound thionin**

Y. OHASHI<sup>1, 2</sup>, T. IWAI<sup>1, 2, 3</sup> and H. KAKU<sup>1</sup> (1National Institute of Agrobiological Sciences, 2CREST/JST, 3Miyagi Prefectural and Horticulture Research Center)