Kazutoshi Okuno

University: Former Professor in Plant Genetics and Breeding Science
Faculty of Life and Environmental Sciences
University of Tsukuba, Japan
Main roles: Honorary member, Japanese Society of Breeding
Former President, Japanese Society of Breeding
Former Associate Member, Science Council of Japan
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Education

Ph.D. from Nagoya University in Japan (Plant Genetics and Breeding)

Previous employment since 2000

April 2000~	Director, Low-temperature Sciences Department National Agricultural Research Center for Hokkaido Region, National Agriculture Research Organization, Sapporo
June 2003~	Director, Gene Bank, National Institute of Agrobiological Sciences
April 2006~	Professor, Graduate School of Life and Environmental Sciences, University of Tsukuba
April 2013~	Researcher, ARENA, University of Tsukuba
March 2015	Retired from University of Tsukuba

International/academic activities since 2003

2003~2006	FAO Focal Point on Plant Genetic Resources in Japan
2003~2006	Global and Asian Panel of CGIAR Interim Science Council
2003	Technical advisor of FAO program on GPA Implementation in Asia
2004	Japanese delegate of FAO Commission on Genetic Resources
2004~2007	Editor-in-Chief, Japanese Society of Breeding
2007	Consultant of IRRI for Rice Conservation Strategy organized by Global Crop Diversity Trust (GCDT)
2008~2012	Dean, Biosphere Resource Science and Technology (Doctor Program), University of Tsukuba

2008~	Associate member, Science Council of Japan
2010~	External reviewer of doctoral dissertations at Agronomy Department, Peshawar Agricultural University, Pakistan
2010~2012	Vice President, Japanese Society of Breeding
2012~2014	President, Japanese Society of Breeding
2014~	Program officer, Japan Association for Techno-innovation in Agriculture, Forestry and Fisheries (JATAFF)
2015	External reviewer, GDI program, Africa Rice Center
2021~	Honorary member, Japanese Society of Breeding

Awards

Award of Japanese Society of Breeding, April 2001
Merit Award, Malaysian Science and Technology Congress, August 1996
Contribution Award to Japanese Society of Breeding, April 2021

Patents and crop varieties registered

1) DNA markers to identify resistance against rice blast disease (U.S.A. patent 09/560,780)
2) Susceptibility allele (Pi21) and resistance allele (pi21) to rice blast and their use (Patent 2005-187867)
3) A total of 15 rice varieties registered by the Ministry of Agriculture, Forestry and Fisheries, the Government of Japan

Publications

I have authored and co-authored 140 original papers and reviews
Recent publications (2004~2020) are as follows.

1) Okuno K (2004) Molecular mechanisms of cold tolerance in rice and wheat (review). *Japanese Journal of Hyperthermic Oncology* 20:51-60
2) Okuno K (2005) Germplasm enhancement and breeding strategies for crop quality in Japan (review). *Plant Production Science* 8:320-325
3) Okuno K, Shirata K, Niino T, Kawase M (2005) Plant genetic resources in Japan: Platforms and destinations to conserve and utilize plant genetic diversity. *Japan Agricultural Research Quarterly* 39:231-237.
4) Fukuoka S, Suu DT, Ebana K, Trinh NL, Nagamine T, Okuno K (2006) Diversity in phenotypic profiles in landrace populations of Vietnamese rice: a case study of agronomic characters for conserving crop genetic diversity on farm. *Genetic Resources and Crop Evolution* 53:753-761.
5) Fukuoka S, Suu DT, Ebana K, Trinh NL, Nagamine T, Okuno K (2006) Genetic organization of aromatic rice as revealed by RAPD markers: A case study in conserving crop genetic resources on farm. *Euphytica* 149:61-71.
6) Park YJ, Dixit A, Ma KH, Lee JK, Lee MH, Chung CS, Nitta M, Okuno K, Kim TS, Cho EG, Rao VR (2008) Evaluation of genetic diversity and relationships within an on-farm collection of *Perilla frutescens* (L.) Britt. Using microsatellite markers. *Genetic Resources and Crop Evolution* 55:523-535.

7) Uga Y, Okuno K, Yano M (2008) QTLs underlying natural variation in stele and xylem structure of rice root. *Breeding Science* 58:7-14.
8) Tabata M, Okuno K (2008) Abnormal grain quality by partial excision of root system in rice, *Japan.J. Crop Science* 77:198-203.
9) Uga Y, Ebana K, Abe J, Morita S, Okuno K, Yano M (2009) Variation in root morphology and anatomy among accessions of cultivated rice (*Oryza sativa* L.) with different genetic backgrounds. *Breeding Science* 59:87-93.
10) Shehzad T, Okuizumi H, Kawase M, Okuno K (2009) Development of SSR-based sorghum (S*orghum bicolor* (L.) Moench) diversity research set of germplasm and its evaluation by morphological traits. *Genetic Resources and Crop Evolution* 56:809-827.
11) Shehzad T, Iwata H, Okuno K (2009) Genome-wide association mapping of quantitative traits in sorghum (S*orghum bicolor* (L.) Moench) by using multiple models. *Breeding Science* 59:217-227.
12) Fukuoka S, Saka N, Koga H, Ono K, Shimizu T, Ebana K, Hayashi N, Takahashi A, Hirochika H, Okuno K, Yano M (2009) Loss of function of a proline-containing protein confers durable disease resistance in rice. *Science* 325:998-1001.
13) Okuno K, Kurata N (2009) Platform and destination in breeding strategies. *Breeding Research* 11:107-126 (in Japanese).
14) Strelchenko PP, Romanova OI, Konarev AV, Okuno K (2010) Identifying global centers of genetic diversity for grain sorghum with the use of rice DNA markers. *Russian Agricultural Sciences* 36:168-171.
15) Strelchenko PP, Okuizumi H, Shehzad T, Malinovskaya E, Kawase M, Fukuoka S, Okuno K (2010) Genetic relationships of sorghum germplasm in Asia and Africa revealed by rice cDNA-STS and indel markers. *Japan Agriculture Research Quaterly* 44: 259-268.
16) Uga Y, Okuno K, Yano M (2010) Fine mapping of *Sta1*, a quantitative trait locus determining stele transversal area, on rice chromosome 9. *Molecular Breeding* 26:533-539.
17) Sedeek SEM, Metwally TF, Okuno K, Abdelkhalik (2010) Genotypic variation of some Egyptian and upland rice genotypes in some physio-morphological traits and microsatellite DNA under drought condition. *J. Agricultural Chemistry and Biotechnology* 1:141-155.
18) Uga Y, Okuno K, Yano M (2011) *Dro1*, a major QTL involved in deep rooting of rice under upland field conditions. *J. Experimental Botany* 62:2485-2494.
19) Hara T, Iwata H, Okuno K, Matsui K, Ohsawa R (2011) QTL analysis of photoperiod sensitivity in common buckwheat by using markers for expressed sequence tags and photoperiod-sensitivity candidate genes. *Breeding Science* Agricultural Chemisrt61:394-404.
20) El Mannai Y, Shehzad T, Okuno K (2011) Variation in flowering time in sorghum core collection and mapping of QTLs controlling flowering time by association analysis. *Genetic Resources and Crop Evolution* 58: 983-989.
21) El Mannai Y, Shehzad T, Okuno K (2012) Mapping of QTLs underlying time in sorghum (*Sorghum bicolor* (L.) Moench), *Breeding Science* 62:151-159.
22) Fukuoka S, Mizobuchi R, Saka N, Ivan S, Matsumoto T, Okuno K, Yano M (2012) A multiple gene complex on rice chromosome 4 is involved in durable resistance to rice blast. *Theoretical and Applied Genetics* 125:551-559.
23) Sakhi S, Shehzad T, Rehman S, Okuno K (2013) Mapping the QTLs underlying drought stress at developmental stage of sorghum (*Sorghum bicolor* (L.) Moench)

by association analysis. *Euphytica* 193:433-450.
24) Uga Y, Sugimoto K, Ogawa S, Rane J, Ishitani M, Hara N, Kitomi Y, Inukai Y, Ono K, Kanno N, Inoue H, Takehisa H, Motoyama R, Nagamura Y, Wu J, Matsumoto T, Takai T, Okuno K, Yano M (2013) Control of root system architecture by *DEEPER ROOTING 1* increases rice yield under drought conditions. *Nature Genetics* 45:1097-1102.
25) Hmon KPW, Shehzad T, Okuno K (2013) Variation in inflorescence architecture associated with yield components in a sorghum germplasm. *Plant Genetic Resources: Characterization and Utilization* 11:258-265.
26) Shehzad T, Okuno K (2013) Breeding for abiotic stresses in sorghum. In Sorghum: Production, Growth Habits and Health Benefits (ed. P.C. Parra), Nova Science Publishers, p.97-111.
27) Shehzad T, Okuno K (2014) Diversity assessment of sorghum germplasm and its utilization in genetic analysis of quantitative traits-A Review. *Australian J. Crop Science* 8: 937-944.
28) Hmon KPW, Shehzad T, Okuno K (2014) QTL underlying inflorescence architecture in sorghum (*Sorghum bicolor* (L.) Moench) as detected association analysis. *Genetic Resources and Crop Evolution* 61:1545-1564.
29) Sakhi S, Rehman S, Okuno K, Shahzad A, Jamil M (2014) Evaluation of sorghum (*Sorghum bicolor*) core collection for drought tolerance: pollen fertility and mean performance of yield traits and its components at reproductive stage. *International J. Agriculture and Biology* 16:251-260.
30) Turki N, Shehzad T, Harrabi M, Tarchi M, Okuno K (2014) Variation in response to salt stress at seedling and maturity stages among durum wheat varieties. *J. Arid Land Studies* 24:261-264.
31) Sbei H, Shehzad T, Harrabi M, Okuno K (2014) Salinity tolerance evaluation of Asian barley accessions (*Hordeum vulgare* L.) at the early vegetative stage. *J. Arid Land Studies* 24:183-186.
32) Sbei H, Sato K, Shehzad T, Harrabi M, Okuno K (2014) Detection of QTLs for salt tolerance in Asian barley (*Hordeum vulgare* L.) by association analysis with SNP markers. *Breeding Science* 64:378-388.
33) Okuno K, Nemoto H (2014) Breeding strategies for climate changes in the 21 Century. *Breeding Research* 16:44-52 (in Japanese).
34) Turki N, Shehzad T, Harrabi M, Okuno K (2015) Detection of QTLs associated with salinity tolerance in durum wheat based on association analysis. *Euphytica* 201:29-41.
35) Okuno K (2015) QTL mapping and gene cloning of durable resistance to rice blast. *J. Botanical Sciences* 4:51-52.
36) Shehzad T, Okuno K (2015) QTL mapping for yield and yield-contributing traits in sorghum (*Sorghum bicolor* (L.) Moench) with genome-based SSR markers. To global climate change. *Euphytica* 203:17-31.
37) Md. Nashir Uddin, Okuno K (2015) Validation of SSR markers linked to flowering time QTLs in sorghum through progeny test. *J. Agriculture, Science and Technology* A5:783-792.
38) Okoshi M, Matsuno K, Okuno K, Ogawa M, Itani T, Fujimura T (2016) Genetic diversity in Japanese aromatic rice (*Oryza sativa* L.) as revealed by nuclear and organelle DNA markers. *Genetic Resources and Crop Evolution* 63:199-208.

39) Yoshida Y, Marubodee R, Ogiso-Tanaka E, Iseki K, Isemura T, Takahashi Y, Muto C, Naito K, kaga A, Okuno K, Ehara H, Tomooka N (2016) Salt tolerance in wild relatives of adzuki bean, *Vigna angularis* (Willd.) Ohwi et Ohashi. *Genetic Resources and Crop Evolution* 63:627-637.
40) Okuno K (2016) Breeding strategies for crop improvement to adapt to global climate change. *J. Arid Land Studies* 26:27-34 (in Japanese).
41) Muhamad K, Ebana K, Fukuoka S, Okuno K (2017) Diversity and differentiation of *Oryza sativa* and *O. rufipogon* in Indonesia. *Genetic Resources and Crop Evolution* 64:41-54.
42) Muhamad K, Ebana K, Fukuoka S, Okuno K (2017) Genetic relationships among improved varieties of rice (*Oryza sativa* L.) in Indonesia over the last 60 years as revealed by morphological traits and DNA markers. *Genetic Resources and Crop Evolution* 64:701-715.
43) Tsuboi K, Shehzad T, Yoneda J, Uraguchi S, Ito Y, Shinsei L, Morita S, Rai H, Nagasawa N, Asari K, Suzuki H, Itoh R, Saito T, Suzuki K, Takano I, Takahashi H, Sakurai K, Watanabe A, Akagi H, Tokunaga T, Itoh M, Hattori H, Fujiwara T, Okuno K, Tsutsumi N, Sahoh-Nagasawa N (2017) Genetic analysis of cadmium accumulation in shoots of sorghum landraces. *Crop Science* 57:1-10.
44) Fukuoka S, Okuno K (2019) Strategies for breeding durable resistance to rice blast using *pi21*. *Crop Breeding, Genetics and Genomics* 1-20, https://doi.org/10.20900/cbgg20190013.
45) Shehzad T, Okuno K (2020) Genetic analysis of QTLs controlling allelopathic characteristics in sorghum. *PLOS ONE* 1-17, https://doi.org/10.1371/journal.pone.0235896.
46) Okuno K, Fukuoka S (2020) Mapping and map-based cloning of QTL conferring durable resistance to rice blast towards rice breeding strategy. In Current Research Trends in Biological Science Vol.4. Book Publishers International. p33-39.
47) Okuno K (2020) Is disease resistance against rice blast controlled by race-nonspecific genes to rice blast durable? *SunText Review of Biotechnology* 1 (1):105.
48) Shehzad T, Okuno K (2021) Quantitative trait locus mapping and genetic improvement to strengthen drought tolerance in sorghum. *In* Molecular Breeding in Wheat, Maize and Sorghum, Strategies for Improving Abiotic Stress Tolerance and Yield (ed. Hossain MA, Alam M, Seneweera S, Rakshit S, Henry R), CAB International, Oxfordshire, UK and Boston, USA, p433-443.