

2. 研究業績 / Research Achievements

(April 2019 – March 2020)

2.1 論文・著書 / Journal Articles/Books/Book Chapters

Journal Articles

- Abd El Baki, H. M., Raoof, M. and Fujimaki, H.: Determining irrigation depths for soybean using a simulation model of water flow and plant growth and weather forecasts. *Agronomy*, **10**: 369, doi: 10.3390/agronomy10030369 (Mar., 2020)
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Books

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Book Chapters

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- 齊藤忠臣・高原慶貴・関栄司・河合隆行・永松大・猪迫耕二：鳥取砂丘における UAV を用いた三次元モデルの作成・精度評価と砂移動の解析. 2019 年度農業農村工学会 (東京) (2019 年 9 月)
- 櫻井建吾・戸田悠介・大森良弘・山崎裕司・高橋宏和・高梨秀樹・津田麻衣・石森元幸・辻本壽・加賀秋人・中園幹生・藤原徹・岩田洋佳：マルチスペクトルデータを用いてダイズ遺伝資源の干ばつ耐性と成長を予測する. 日本育種学会第 136 回講演会 (東京) (2020 年 3 月)
- 佐藤耕平・戸田悠介・大森良弘・山崎裕司・高橋宏和・高梨秀樹・津田麻衣・石森元幸・鐘ヶ江弘美・辻本壽・澤田有司・加賀秋人・中園幹生・藤原徹・岩田洋佳：ダイズ主茎におけるリグニン分布パターン定量とその遺伝解析. 日本育種学会第 136 回講演会 (東京) (2020 年 3 月)
- 猿渡あゆみ・小松亜璃沙・中原浩貴・森太郎・近藤謙介・松添直隆：Fe(III)-EDTA 浸漬処理が青枯病発病抑制効果に及ぼす影響. 日本生物環境工学会九州支部会 2019 久留米大会 (久留米) (2019 年 11 月)
- 嶋崎太一・金俊植・妻鹿良亮・安倍史高・宮本皓司・山根久和・吉田健太郎・岡本昌憲：アブシシン酸受容体がもたらすコムギ病害抵抗性機構の解析. 植物化学調節学会第 54 回大会 (鳥取) (2019 年 11 月)
- 杉本太郎・Buyanaa, C.・Erdenebaatar, S.・伊藤健彦・Munkhtogtokh, O.：モンゴル西部山岳地帯に生息するユキヒョウの生息密度推定. 日本哺乳類学会 2019 年度大会 (東京) (2019 年 9 月)
- 高橋慶二郎・龍超逸・小松亜璃沙・中原浩貴・近藤謙介・松添直隆：*Suaeda salsa* との混植がキュウリの生育に与える影響. 日本生物環境工学会九州支部会 2019 久留米大会 (久留米) (2019 年 11 月)
- 田尾航大・中原浩貴・松添直隆・久保香織・森太郎：滋賀県在来「杉谷なすび」および「杉谷とうがらし」の接ぎ木栽培に適した台木品種の選定. 園芸学会令和元年度秋季大会 (島根) (2019 年 9 月)
- 谷口武士・大和政秀・日下部亮太・赤路康朗・Goomaral Altansukh・Undarmaa Jamsran・山中典和：家畜による被食が土と根のアーバスキュラー菌根群集に与える影響. 第 67 回日本生態学会大会 (名古屋) (2020 年 3 月)
- 戸田悠介・佐々木剛志・大森良弘・山崎裕司・高橋宏和・高梨秀樹・津田麻衣・澤田有司・鐘ヶ江弘美・辻本壽・加賀秋人・中園幹生・藤原徹・岩田洋佳：マーカー遺伝子型と環境情報を用いた時系列的な作物形質の予測：UAV リモートセンシングで計測されたダイズ植被面積への応用. 日本育種学会第 136 回講演会 (東京) (2020 年 3 月)
- 内田孝三・辻本壽：チップ栽培を利用したコムギの簡易促成栽培について. 日本育種学会・第 11 回中国地域育種談話会 (岡山) (2019 年 12 月)
- Wu, J. and Kurosaki, Y.: Effect of dry-season vegetation on dust occurrence at Tsogt-Ovoo in the northern Gobi De-

- sert. 日本気象学会 2019 年秋季大会 (福岡) (2019 年 10 月)
- Wu, J., Kurosaki, Y., Du, C. and Wang, T.: Monitoring and assessing aeolian desertification processes based on a dust erodibility index - A case study in the Xilingol grassland, China. 日本地球惑星科学連合 (JpGU) 2019 年大会 (千葉) (2019 年 5 月)
- 山崎裕司・Gorafi, Y. S. A.・Tahir, I. S. A.・辻本壽: リン欠乏耐性に関する未利用遺伝資源を含むコムギ系統の生理学的及び元素解析. 第 5 回植物の栄養研究会 (東広島) (2019 年 9 月)
- 山崎裕司・Gorafi, Y. S. A.・Tahir, I. S. A.・辻本壽: リン節肥性コムギ系統の生理学および元素分析. 日本育種学会・第 11 回中国地域育種談話会 (岡山) (2019 年 12 月)
- 山崎裕司・ゴラフィ ヤシル・タヒル イザット・辻本 壽: 未利用遺伝資源由来のリン欠乏耐性コムギ系統における耐性メカニズムの解明. 日本育種学会第 136 回講演会 (東京) (2020 年 3 月)
- Invited Lectures (招待講演)**
- Abd El Baki, H. M.: A training course on using WASH 2D model to determine optimal irrigation depths. Kafrelsheik University, Kafrelsheikh, Egypt (Nov., 2019)
- Fujimaki, H.: Determination of irrigation depths using WASH_2D and weather forecast. 6th Congress on Soil and Water Resources. Izmir, Turkey (Nov., 2019)
- Ishii, T.: RNA-guided endonuclease - in situ labelling (REGN-ISL) - a fast CRISPR/Cas9 based cytogenetic tool for various species. International Conference of Plant Chromosome Engineering and Functional Genomics. Beijing, China (Jun., 2019)
- Ishii, T.: CRISPR/Cas9-mediated labelling of genomic sequences in living and fixed cells in various species. The society of chromosome Research. Kobe, Japan (Sep., 2019)
- Ishii, T.: Chromosome elimination in plant wide hybridization for sustainable agriculture in future dryland. Advances in Agricultural Sciences. Addis Ababa, Ethiopia (Oct., 2019)
- Ishii, T. and Houben, A.: RNA-guided endonuclease in situ labelling (RGEN-ISL): CRISPR-based imaging of genomic sequences in plants and animals. Plant and Animal Genome XXVIII Conference. San Diego, USA (Jan., 2020)
- Ishii, T., Juranić, M., Maheshwari, S., Bustamante, F. O., Vogt, M. M., Salinas-Gamboa, R., Dreissig, S., Gursansky, N., How, T., Fuchs, J., Schubert, V., Spriggs, A., Vilele-Calzada, J. P., Comai, L., Koltunow, A. M. G. and Houben, A.: Functional characterization of cowpea centromeres. Plant and Animal Genome XXVIII Conference. San Diego, USA (Jan., 2020)
- Kimura, R.: Recent trends of climatical indices and actual conditions of aridity in drylands. 9th International Symposium on Atmospheric Sciences ATMOS 2019. Istanbul, Turkey (Oct., 2019)
- 木村玲二: 気候変動・地球温暖化と乾燥地. 上智大学連続講演会「環境と人間—地球規模、中東北アフリカ、日本」(東京) (2019年11月)
- 黒崎泰典: 健康被害、気候変動を引き起こす黄砂—その発生メカニズムの最新研究—. 東京理科大学第11回坊っちゃん講座 (東京) (2020年1月)
- Sun, J.: Effects of climate change and human activities on the structure and function of alpine ecosystem. Grassland Ecology Forum, Guodong Han. Inner Mongolia, China (Nov., 2019)
- Sun, J.: The degraded alpine grassland. Annual meeting of the Restoration Ecology Laboratory. Huakun Zhou, China (Nov., 2019)
- Sun, J.: Effects of climate change and human activities on the structure and function of alpine ecosystem. GeoForum. Tao Zeng, Chengdu, China (Nov., 2019)
- Sun, J.: Biogeography of Tibetan Plateau. Second Tibetan Plateau Scientific Expedition and Research. Shiliang Liu, Beijing, China (Nov., 2019)
- Tahir I. S. A., Meheesi, S. E. M., Mohamed, I. E. S, Gorafi, Y. S. A, Tsujimoto, H., Tadesse, W., Bassi, F. M. and Amri A.: Wheat improvement for heat prone agro-ecologies of Sudan and Sub-Saharan Africa: Breeding and pre-breeding approaches for climate change resilient varieties. The 1st International Expert Workshop on Pre-breeding Utilizing Crop Wild Relatives. Rabat, Morocco (Apr., 2019)
- Tsubo, M.: Historical relationship between climate and crop yield: A case of maize South Africa. 35th Annual Conference of the South African Society for Atmospheric Sciences. Vanderbijlpark, South Africa (Oct., 2019)
- Tsujimoto H.: Can we find abiotic stress tolerance in wheat related-wild species? - Experiences and lessons learned in pre-breeding of wheat with drought and heat stress tolerance. The 1st International Expert Workshop on Pre-breeding Utilizing Crop Wild Relatives. Rabat, Morocco (Apr., 2019)
- Tsujimoto, H.: Innovative wheat breeding technology using novel genetic resources of related wild species. Multi-stakeholder Forum: Turning Agricultural and Environmental Challenges into Opportunities for Investment and Innovation in the Aral Sea Basin. Tashkent, Uzbekistan (Aug., 2019)
- Tsujimoto, H.: Mining wild genes/traits for wheat improvement in sustainable agriculture under climate change. Cereal Endophyte Workshop. Adelaide, Australia (Jan., 2020)
- Tsujimoto, H., Gorafi, Y. S. A. and Tahir, I. S. A.: Extensive wheat germplasm enhancement to secure food under climate change. International Conference of Plant Chromosome Engineering and Functional Genomics for Breeding 2019. Beijing, China (Jun., 2019)

2.3 報告書/Reports

- Nagamatsu, D. and Yamanaka, N.: Overview of the Tottori Sand Dunes. *From Agricultural Development in the Tottori Sand Dunes to Dryland Development in the World* (Edited by ALRC and JICA), JICA, Tokyo, pp. 1-9 (Mar., 2020)
- Tomemori, H. and Tsujimoto, H.: Development of crops suitable for sand soil. *From Agricultural Development in the*

Tottori Sand Dunes to Dryland Development in the World (Edited by ALRC and JICA), JICA, Tokyo, pp. 17-24 (Mar., 2020)

Yamanaka, N.: Development of technology to stop sand movement. *From Agricultural Development in the Tottori Sand Dunes to Dryland Development in the World* (Edited by ALRC and JICA), JICA, Tokyo, pp. 10-16 (Mar., 2020)

2.4 公開セミナー／Open Seminar

1) Open seminar

1. The study of iron nutrition in gramineous plants (May 16, 2019)

Tomoko NOZOYE 野副 朋子

Associate Professor, Center of Liberal Arts, Meiji Gakuin University

明治学院大学教養教育センター・准教授

2. Recent situation of the use of wild species for wheat breeding at CIMMYT: very promising sources for drought improvement and breeding (Jun. 13, 2019)

Masahiro KISHII 岸井 正浩

Senior Researcher, International Maize and Wheat Improvement Center (CIMMYT)

国際トウモロコシ・コムギ改良センター 主任研究員

3. Barley diversity now and 6000 years ago: archaeogenetics and genebank genomics (Sep. 4, 2019)

Martin MASCHER

Head of Domestication Genomics Research Group, Leibniz Institute of Plant Genetics and Crop Plant Research (IPK)

ライプニッツ植物遺伝作物学研究所・作物栽培化ゲノミクス グループリーダー

4. Plant genome instability, natural variation, and next-generation plant breeding (Oct. 11, 2019)

Luca COMAI

Professor, Department of Plant Biology and Genome Center, UC Davis

カリフォルニア大学デービス校植物生物学・ゲノムセンター・教授

5. A study of brassinolide and lime for mitigating waterlogging and acidity effects on maize in soils of south-east Nigeria (Oct. 29, 2019)

Victoria Oko OTIE

Department of Soil Science, Faculty of Agriculture Forestry and Wildlife Resources Management, University of Calabar, Nigeria

カラバ大学農林野外資源管理学院土壌科学学部・助手

6. The in planta Particle Bombardment (iPB) method for cereal transformation and genome editing (Jan. 21, 2020)

Ryozo IMAI 今井 亮三

Senior Principal Scientist, Institute of Agrobiological Sciences, NARO

農研機構生物機能利用研究部門・主席研究員

2) Colloquium

22nd Colloquium (Jun. 21, 2019)

(1) Soil and Water Conservation Research in Drylands

Majed ABU-ZREIG

Professor, International Platform for Dryland Research and Education (IPDRE), Tottori University

鳥取大学国際乾燥地研究教育機構・特命教授

(2) Induction of defense response in tomato against plant diseases and salinity stress using a non-pathogenic bacteria

Hiroki NAKAHARA 中原 浩貴

Project Researcher, Arid Land Research Center, Tottori University

鳥取大学乾燥地研究センター・プロジェクト研究員

23rd Colloquium (Sep. 20, 2019)

(1) Effectiveness of compost source and application thickness on properties of a sandy soil and sand stabilization

Mubarak Abdelrahman ABDALLA

Foreign Research Scholar (Visiting Professor), Arid Land Research Center, Tottori University

鳥取大学乾燥地研究センター・外国人研究員 (客員教授)

(2) Grazing exclusion of Tibetan Plateau

Jian SUN 孫 建

Foreign Research Scholar (Visiting Associate Professor), Arid Land Research Center, Tottori University

鳥取大学乾燥地研究センター・外国人研究員 (客員准教授)

2.5 受賞、特許

(1) 受賞

賞の名称：鳥取大学長表彰
受賞者：妻鹿 良亮
受賞年月日：2020年1月6日
授与団体：鳥取大学
研究タイトル：「節水型耐乾性」という新しいタイプの乾燥ストレス耐性を持つコムギに関する研究功績

賞の名称：優秀発表賞
受賞者：松永幸子（連合農学研究科博士課程1年次、主指導教員：辻本壽）
受賞年月日：2019年12月22日
授与団体：日本育種学会・中国地域支部
研究タイトル：パンコムギの異なる生育ステージにおける高温ストレス応答の特性評価

(2) 特許

特許番号：19194184.8-111
特許権者：ライプニッツ植物遺伝学・作物植物研究所 (IPK、ドイツ)
発明者：石井孝佳、Andreas Houben (IPK)
発明の名称：RNA-GUIDED ENDONUCLEASE AND LABELING
登録日：2020年2月3日

2.5 Honors and Awards, Patent

(1) Award

Name of Prize: Tottori University President Award
Name of Recipient: Ryosuke Mega
Date: Jan. 6, 2020
Name of Offering Organization: Tottori University
Research Title: Research achievements on wheat with a new type of drought stress resistance "water-saving drought tolerance"

Name of Prize: Excellent Presentation Award
Name of Recipient: Sachiko Matsunaga (United Graduate School of Agricultural Sciences, D1, Supervisor: Tsujimoto, H.)
Date: Dec. 22, 2019
Name of Offering Organization: Japan Society of Breeding, Chugoku-region Branch
Research Title: Characterizing physiological response of bread wheat to heat stress at different growth stages

(2) Patent

Patent Number: 19194184.8-111
Patentee: Leibniz-Institut für Pflanzengenetik und Kulturpflanzenforschung (IPK, Germany)
Inventor: Takayoshi Ishii and Andreas Houben (IPK)
Title of the Invention: RNA-GUIDED ENDONUCLEASE AND LABELING
Registration Date: Feb. 3, 2020

2.6 外部資金 / External Funds

令和元年度科学研究費補助金／Grants-in-Aid for Scientific Research in FY2019

研究種目 Research categories	研究代表者 Principal Investigator	研究課題名 Research Title	
基盤研究 (B) Scientific Research(B)	辻本 壽 Tsujimoto, Hisashi	高温耐性コムギ系統の QTL 解析と選抜マーカーの開発 QTL analysis of high-temperature tolerant wheat lines and development of selection markers	
基盤研究 (B) Scientific Research(B)	木村 玲二 Kimura, Reiji	乾燥地における土地劣化計測システムとモニタリング手法の開発 Development of observation and monitoring system for land degradation in arid regions	
		研究分担者 Co-Investigators	森山 雅雄 (長崎大学) 松島 大 (千葉工業大学) Moriyama, Masao (Nagasaki University) Matsushima, Dai (Chiba Institute of Technology)
国際共同研究加速基金 (国際共同研究強化 (B)) Fund for the Promotion of Joint International Research (Fostering Joint International Research (B))	藤巻 晴行 Fujimaki, Haruyuki	土壌塩分輸送シミュレーションモデルを用いた除塩用水量の最適化 Determination of leaching depth using a numerical simulation model of salt movement	
		研究分担者 Co-Investigators	トデリッチ クリスティーナ (鳥取大学) 齊藤 忠臣 (鳥取大学) 大西 純也 (国際農林水産業研究センター) 實野 雅太 (東京農業大学) Toderich, Kristina (Tottori University) Saito, Tadaomi (Tottori University) Onishi, Junya (Japan International Research Center for Agricultural Sciences) Jitsuno, Masataka (Tokyo University of Agriculture)
新学術領域研究 (研究領域提案型) Scientific Research on Innovative Areas (Research in a proposed research area)	伊藤 健彦 Ito, Takehiko	「遊動」を予測する：モンゴル草原の環境条件と野生草食獣の移動・活動量の関係 Prediction of nomadic movement: relationships between movement and activity of wild mammalian herbivores and environmental conditions in Mongolia's grassland	
挑戦的研究 (萌芽) Challenging Research (Exploratory)	伊藤 健彦 Ito, Takehiko	草原棲哺乳類の異なる移動戦略共存機構の解明と移動誘発ホルモン検出の試み Coexistence mechanism analysis of different migration strategies of grassland mammals and detection of hormones inducing migration	
		研究分担者 Co-Investigators	木下 こづえ (京都大学) 飯島 慈裕 (三重大学) 杉本 太郎 (明治大学) Kinoshita, Kodzue (Kyoto University) Iijima, Yoshihiro (Mie University) Sugimoto, Taro (Meiji University)
若手研究 (A) Young Scientists(A)	谷口 武士 Taniguchi, Takeshi	メタゲノム解析と難培養微生物利用を基盤とした有用な植物-複合微生物共生系の構築 Development of effective plant-symbiotic microbes system by metagenome and cultivation of non-culturable microbes	
若手研究 Early-Career Scientists	山崎 裕司 Yamasaki, Yuji	パンコムギのキャノピー温度関連形質とその多面発現効果の遺伝育種の解析 Breeding analysis for pleiotropic effects on canopy temperature and related traits in bread wheat	

若手研究 Early-Career Scientists	Fenta, Ayele Almw	Development of precision estimation method of rainfall erosivity for better understanding of soil erosion in data-sparse regions
若手研究 Early-Career Scientists	石井 孝佳 Ishii, Takayoshi	イネ科亜科間交雑での染色体脱落: 染色体脱落を制御している雄側因子の特定 Chromosome elimination in sub-family distance wide hybridization in poaceae species: elucidat the paternal factor X in chromosome elimination
特別研究員奨励 費 (外国人特別研 究員) JSPS Research Fellows (JSPS International Research Fellow)	辻本 壽 Tsujiimoto, Hisashi	高温耐性を示すハマニンニク染色体添加コムギの RNA-Seq とメタボロミ ック解析 RNA-seq and metabolomic analyses of Leymus chromosome added wheat lines showing heat tolerance

他機関からの研究分担者 / Co-Investigator

研究種目 Research categories	研究分担者 Co-Investigator	研究課題名 Research Title	研究代表者 Principal Investigator
基盤研究 (A) Scientific Research(A)	黒崎 泰典 Kurosaki, Yasunori	ダストフラックス長期変動に寄与する人 為的影響の定量的評価 Long-term Fluctuations of Dust Flux and Quantitative Assessments of Human Activities	鹿島 薫 (九州大学) Kashima, Kaoru (Kyushu University)
基盤研究 (A) Scientific Research(A)	黒崎 泰典 Kurosaki, Yasunori	東アジア沙漠地帯における黄砂バイオエ アロゾルの発生過程とその越境輸送ルー トの解明 Bioaerosols transported for long range distance over East Asia	牧 輝弥 (金沢大学) Maki, Teruya (Kanazawa University)
基盤研究 (A) Scientific Research(A)	木村 玲二 Kimura, Reiji	北アフリカ乾燥地域における持続可能な 地下水利用システムの構築 Development of the sustainable underground water use in arid regions of North Africa	岩崎 えり奈 (上智大学) Iwasaki, Erina (Sophia University)
基盤研究 (B) Scientific Research(B)	藤巻 晴行 Fujimaki, Haruyuki	農業工学とコロイド化学の融合を基軸と する土壌・水環境保全技術の展開 Development in soil and water technology with integrating agricultural engineering and colloid science	小林 幹佳 (筑波大学) Kobayashi, Motoyoshi (University of Tsukuba)
基盤研究 (B) Scientific Research(B)	木村 玲二 Kimura, Reiji	Air Irrigation : 乾燥地の大気由来の未利用 水資源で実現する節水農業 Air Irrigation: Water-saving agriculture using unutilized water resource derived from atmosphere in arid regions	森 牧人 (高知大学) Mori, Makito (Kochi University)
基盤研究 (B) Scientific Research(B)	中原 浩貴 Nakahara, Hiroki	トマトの難防除土壌伝染性病害である青 枯病と半身萎凋病に対する新しい防除法 の確立 Establishment of a new control method for bacterial wilt and <i>Verticillium</i> wilt of hardly controllable soil-borne diseases in tomato	松添 直隆 (熊本県立大学) Matsuzoe, Naotaka (Prefectural University of Kumamoto)
国際共同研究加速 基金 (国際共同研 究強化 (B)) Fund for the Promotion of Joint International Research (Fostering Joint International Research (B))	石井 孝佳 Ishii, Takayoshi	日本のコムギ研究リソースと国際農業研 究機関の連結による新遺伝資源創出と育 種展開 New genetic resource development and advanced breeding through connecting the Japanese wheat research resources to a renowned international agricultural research institute	松岡 由浩 (福井県立大学) Matsuoka, Yoshihiro (Fukui Prefectural University)

研究種目 Research categories	研究分担者 Co-Investigator	研究課題名 Research Title	研究代表者 Principal Investigator
基盤研究 (C) Scientific Research(C)	木村 玲二 Kimura, Reiji	風食発生の指標となるごく薄い地表面の 土壌水分モデルの開発 Development of soil moisture model of extremely thin ground surface which is an indicator and influence for occurrence of wind erosion	鈴木 純 (信州大学) Suzuki, Jun (Shinshu University)
基盤研究 (C) Scientific Research(C)	木村 玲二 Kimura, Reiji	景観保全活動が天然記念物鳥取砂丘の砂 移動および植生分布の変動に与える影響 の評価 Evaluation of effectiveness to rehabilitate sand movement and curb grassland encroachment by landscape conservation activities at the Tottori Sand Dunes natural monument	高山 成 (大阪工業大学) Takayama, Naru (Osaka Institute of Technology)
基盤研究 (C) Scientific Research(C)	谷口 武士 Taniguchi, Takeshi	根圏での樹木と林床植生間の競争緩和が 窒素動態と菌根を介した樹木の生長に及 ぼす影響 Effects of mitigation of competition in rhizosphere between tree and understory vegetation on nitrogen dynamics and tree growth through mycorrhiza	福澤 加里部 (北海道大学) Fukuzawa, Karibu (Hokkaido University)
基盤研究 (C) Scientific Research(C)	藤巻 晴行 Fujimaki, Haruyuki	物理センサ群を用いた土壌・樹木・大気連 続系における物質移動・貯留特性の解明 Clarification of mass transfer-storage characteristic of trees in soil-plant-atmosphere continuum using physical sensors	齊藤 忠臣 (鳥取大学) Saito, Tadaomi (Tottori University)