SAJJAD A. RAO

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EDUCATION AND CREDENTIALS:

PhD [1997] Agricultural Sciences	The University of Liverpool, England, United Kingdom.
M.Sc. [1990] (Hons) Agriculture, PB&G	University of Agriculture, Faisalabad, Pakistan.
B.Sc. [1988] (Hons) Agriculture	University of Agriculture, Faisalabad, Pakistan.
CAE [2016] Certificate in Adult Education	Red River College, Winnipeg Manitoba, Canada
PBL [2012] Cert. in Problem-based learning	Police Society for Problem-based Learning, ACC, MB, Canada
PAC [1997] Cert. in Pesticide Application	Warwickshire College, England United Kingdom

CAREER SUMMARY:

Research Professor	Assiniboine Community College Brandon MB.	(2011- Present)
Research Scientist/Plant Breeder	Ag-Quest Inc. Minto MB Canada	(2010-2011)
Regulatory Specialist	Syngenta Crop Protection Inc. Canada	(2009-2009)
Assistant Area Manager	Rol-Land Farms limited, Ontario Canada	(2007-2009)
National Manager (R&D)	Monsanto Inc. (Asia Pacific)	(2003-2007)
Research Agronomist	Robert Seeds Limited, Khanewal, PK	(1998-2002)
PhD Research Scholar	The University of Liverpool U.K.	(1994-1998)
Senior Assistant Manager	Bayer Crop Science, Multan, PK	(1991-1994)

CONTRIBUTIONS

1. Most Significant Contributions to Research and/or to Practical Applications

Prof. Sajjad Rao is an accredited Canadian plant grower and agrologist with 25+ years of experience in applied research and teaching. He is also highly experienced in providing senior management level leadership for multinational agricultural companies, and has proven capacity to lead research & development projects for industry. Areas of research interest include plant nutritional qualities, plant proteins, fruit quality and plan health, foliar nutrients and soil biological stimulators, sustainable greenhouse technology, new crop genetics, and local crop production and diversification.

The following are the most significant contributions to research and practical applications related to Professor Sajjad Rao's career over the last six (6) years, including contributions made prior but for which the impact is being felt now. Each contribution stems from his expertise and his work in developing wheat varieties for North America, and in commercializing corn hybrids in the Asian-Pacific sphere. Currently, Dr. Rao's research in focused on innovation of sustainable greenhouse production technologies, food systems, and employing novel genetics in horticultural and agronomic field crops.

Contribution #1: (2021): Established and advanced efficient and economical technical growing methodology for producing slips under modified passive solar greenhouse settings that ensure optimum success. ***Practical Application*:** Slip production methodology under modified passive solar greenhouse

settings will provide Canadian seed businesses/propagators an economically feasible process to grow sweet potato slips commercially in greenhouse systems with modified passive solar settings. Using this methodology, local slip producers can provide a higher quality product for growers, impacting crop success and improve yield resulting in further economic gain. Furthermore, local growers will have added control over the availability and quality of planting material.

Research is represented in these papers:

Rao, S.A., Abbey, L. and Khakbazan, M. (2018). Impact of solar energy on greenhouse climate and crop production. Acta Hortic. 1227, 151-158. DOI: 10.17660/ActaHortic.2018.1227.18

Rao, S.A and Singh, P. (2022)., Sustainable Passive Solar Greenhouses: A viable option for propagating sweet potato (Ipomoea batatas L.) slips for colder climate regions. Article submission in progress.

Contribution #2: (2020): Identified strawberry varieties having better wintering index for production in colder climates. Research published in International Journal of Fruit Sciences. ***Practical Application*:** Research provides strawberry genetic diversity among the early, mid, and late cultivars, and gives growers a selection of new cultivars with better plant and berry traits that are more suitable to specific environmental conditions.

Research is represented in this paper:

Rao, S.A., Mintenko, A., Abbey, L. and Singh, P. (2020). Wintering index and yield traits for early, mid and late season strawberry for colder climates. International Journal of Fruit Sciences. 20:2, 151-158. DOI: 10.1080/15538362.2020.1774471

Contribution #3: (2019): Established a successful research program in crop diversification by commercializing new and novel genetics "Radiance" sweet potato in Canadian Prairies cropping production systems. *Practical Application*: In 2020, vegetable growers started sweet potato commercial production started in Manitoba. This research helped local vegetable growers to take advantage of locally developed superior sweet potato varieties, resulting in higher marketable yields.

Research is represented in this paper:

Rao, S.A., Singh, P and Gonsalves, T. (2022). Black plastic mulch affects soil temperature and yield of sweet potato under short season temperate climates. International Journal of Vegetable Science. DOI: 10.1080/19315260.2022.2111625

Contribution #4: (2018): Developed sustainable passive solar greenhouse technology and created a strong link between the sustainable management of natural resources like utilizing solar energy into different forms, to supplement the lighting in a low-tech passive greenhouse model in addition to heating and crop production practices for sufficient and nutritious food to remote communities. *Practical Application*: The finding from this research is practically applied at Seven Oaks School Division, a new sustainable greenhouse project almost completed; and a sustainable greenhouse project is in place with Nisichawayasihk Cree First Nation, based in Nelson House; and Peguis First Nation. Waywayseecappo First Nation is collaborating with Assiniboine Community College on a new greenhouse project. Research outcomes published in Canadian Journal of Plant Science and Acta Horticulturae.

Research is represented in this paper:

Abbey L., **Rao, S.A**. (2018). "Differential response of plant species to greenhouse microclimate created by design technology and ambient conditions". *Canadian Journal of Plant Science*, 98: 1–9 (2018). Doi.org/10.1139/CJPS-2016-0419.

Contribution #5: (2013): Developed general purpose spring wheat variety "WFT 603" for western Canadian growers. Canadian Food Inspection Agency registered #7458. The development of "WFT 603" wheat variety for Canadian Prairies is among my novel accomplishments from my crop genetic improvement program, followed by "WFT 1001" a General-Purpose wheat for Canadian Prairies for wheat growers. ***Practical Application*****:** Western growers are currently growing WFT603 wheat as a value-added variety for their growing conditions, as WFT 603 offers improved *Fusarium* head blight disease resistance. Rated as "resistant" to leaf and stem rust, with "good resistance" to common bunt, and "intermediate" resistance to loose smut plant diseases.

Canadian Food Inspection Agency (2014). Plant varieties, Plant Breeder Rights. Wheat (*Triticum aestivum*) WFT603. Registration # 7458. Breeder: Sajjad Rao.
https://inspection.canada.ca/english/plaveg/pbrpov/cropreport/whe/app00009582e.shtml
https://inspection.canada.ca/active/netapp/regvar/regvare.aspx?id=4980

2. Research Contributions and Practical Applications

Full Paper (Published in last 5 years)

Rao, S.A., Hendricks B., Gray A. and Singh P (2022). Culinary Treatments Affect Sensory Attributes and Consumer Preference for Sweet Potato Cultivars. J. of Food Research. Vol. 12 (1). p1-8. DOI:10.5539/jfr.v12n1p1

Rao, S.A., Singh, P and Gonsalves, T. (2022). Black plastic mulch affects soil temperature and yield of sweet potato under short season temperate climates. International Journal of Vegetable Science. DOI: 10.1080/19315260.2022.2111625

Rao, S. A. (2022): Impact of planting dates on yield and pod quality traits of snap bean under short-temperate season climates. International Journal of Horticultural Science 28: 57-63. https://doi.org/10.31421/ijhs/28/2022/110542020

Rao, S.A., Mintenko, A., Abbey, L. and Sing, P. (2019). Wintering index and yield traits for early, mid and late season strawberry for colder climates. Int. J. of Fruit Science. 20:2, 151-158. DOI: 10.1080/15538362.2020.1774471

Rao, S.A., Abbey, L. and Khakbazan, M. (2018). Impact of solar energy on greenhouse climate and crop production. Acta Hortic. 1227, 151-158. DOI: 10.17660/ActaHortic.2018.1227.18

Abbey L., **Rao, S.A**. 2018). "Differential response of plant species to greenhouse microclimate created by design technology and ambient conditions". *Canadian Journal of Plant Science*, 98: 1–9 (2018). Doi.org/10.1139/CJPS-2016-0419.

Rao H., Kauser N., Mirbahar A. A., Kazmi S. K., Khan S. **Rao, S.A**. (2016). "Detection of GM contamination in IRRI-6 variety of rice (Oryza sativa L.) grown in Pakistan". Int. J. Biotech., 13 (4) 523-527.

Online Resources (Publications)

Magazines/Print News:

2021 "Warm oasis under glass-photo essay". The Western Producer, Feb 25,2021. https://www.producer.com/news/warm-oasis-under-glass-photo-essay/

2021 "Funding boost for sweet potato research". The Brandon Sun, Thursday March 18, 2021. https://www.brandonsun.com/local/funding-boost-for-sweet-potato-research-574013572.html

2020 "Agricultural research gets a leg up". Virden Empire-Advance: May 25, 2020. https://www.empireadvance.ca/news/local-news/agricultural-research-gets-a-leg-up-1.24140216

2020 "MARK MY WORDS: Putting my money on agriculture": Brandon Sun: May 16, 2020

2020 "Sweet Potato Sweet Research" Manitoba master Gardener Association Newsletter March 2020 by Sajjad Rao. https://www.mgmanitoba.com/2020/03/04/sweet-potatoes-sweet-research/

2018 "Gearing up for Prairie sweet potatoes". Fruit and Vegetable Magazine Canada: March 2018. Volume 74. No. 1. p 18-20.

2017 "Brandon Researcher Testing Commercial Viability of Sweet Potatoes": by Cory Knutt: Pembina Valley Online: March 25, 2017.

2017 "Local roots". Winnipeg Free Press. Winter Education Guide Dec 7, 2017. p 12

2016 "Sweet potato may enter Manitoba rotation". The Manitoba Cooperator. November 16, 2016. Volume 74 No.45. p 18.

2016 "Sweet potatoes showing promise as a Manitoban crop". The AgriPost Manitoba Canada. Volume 16 Issue 9. p 1-2.

2016 "Sweet potato success for ACC researcher". The Brandon Sun Local Edition. October 15, 2016. p 1-2.

3. Contributions to practical applications of knowledge.

Awards

- *"Stellar Award-Teaching Excellence"* by Assiniboine Community College in recognition of individual and collective efforts, and demonstrable success, in teaching through the COVID-19 pandemic in the 2020/21 academic year.
- *"Excellence Education Award"* by Assiniboine Community College Alumni Association, Brandon Manitoba, Canada: 2020.

Membership on committees, boards, or policy-making bodies

Member, Board of Studies, Namal University, Mianwali, Pakistan (2022–Present)

Member, Program Advisory Committee ACC Canada (2012–Present)

Member, Horticulture School Planning Committee, Manitoba Agriculture, Canada (2014–Present)

Research Advisor, Prairie Fruit Growers Association, Canada, (2013–Present)

Advisor, R&D, Plant Breeding; Ag Quest Inc. Minto Canada, 2012–Present)

Board Member, Brandon Food Council, City of Brandon, Manitoba, Canada (2019–Present)

Member, Agronomy Team, Prairie Grain Development Committee, Canada (2010–Present)

Director-Board Member, Ontario Institute of Agrologists (2009–Present)

Public Education

Invited Speaker: 2023. *Next Generation Greenhouse Farming*-A Productive and Lucrative Agribusiness Venture-Growing crops and vegetables in a sustainable greenhouse technology in colder climates, protecting crops from extreme weather conditions and from certain pests. @Manitoba Ag Days (Canada). Jan 19, 2023. Canada's Largest Indoor event showcasing every aspect of agricultural production expertise, technology and equipment.

Panelist Speaker: 2022. "WATER & WASTEWATER USAGE" at CULTIVATE Sustainability Conference and Trade Show. September 7, 2022 RBC Convention Centre, Winnipeg, Manitoba, Canada.

Invited Speaker: 2022. *Hybrid High tunnel/Passive Solar Greenhouse*-A affordable options that give farmers flexibility in crop production and management. @ Direct Farm Marketing Conference, Manitoba, Canada. Feb 5, 2022.

Invited Speaker*:* 2021 NAMAL Institute Agribusiness Seminar- *Advancing Agriculture to Agri-Business Learning and Innovation*, October 12, 2021

Invited Speaker 2020 Direct Farms Marketing Conference. Brandon, Manitoba, Canada: Feb 28, 2020.

Invited Speaker*/Presenter*: 9th North American Strawberry Symposium. Orlando, USA: Feb 4, 2019.

Invited Speaker Agriculture in the Classroom". Richardson Farm, Winnipeg, Manitoba, Canada: October 25, 2019.

Invited Speaker 2018 Direct Farms Marketing Conference. Brandon, Manitoba, Canada: Feb 10, 2018.

Invited Speaker*/Presenter*: "Impact of solar energy on greenhouse climate and crop production" GreenSys2017-International Symposium on New Technologies for Environment Control, Energy-Saving and Crop Production in Greenhouse and Plant Factory. Beijing, China: August 22, 2017.

Invited Speaker "Effect of Solar Energy on Greenhouse Crop Production" Western Canada Cleantech Innovation Forum. Winnipeg, Manitoba, Canada: November 29-30 2017.

Co-organizer and Invited Speaker Field to Fork Symposium. Establishing a Food Security for Rural and Remote Communities Research Network. Manitoba, Canada: March, 2016 & 2017.

4. Contributions to the Training of Highly Qualified Personnel (HQP)

External Examiner and/or Co-Supervisor (Postgraduate): Post-graduate thesis evaluated: PhDs (dissertations title as under):

- Exploring regeneration and transformation system in locally developed tomato and expression analysis of HBsAg gene in tomato. (2021). National Institute for Genomics and Advance Biotechnology (NIGAB).
- Evaluating genetic stability of micropropagated data palm (*Phonex Dactylifera* L.) varieties using inflorescence. (2018). Shah Abdul Latif University, Kahairpur, Sindh, Pakistan.
- Karyotype analysis of elite varieties of date palm (*Phonex Dactylifera* L.) growing in Sindh. Pakistan. (2018). Shah Abdul Latif University, Kahairpur, Sindh, Pakistan.
- Ecological studies on some desert species in district Khairpur, Sindh Pakistan. (2016). Shah Abdul Latif University, Kahairpur, Sindh, Pakistan.