

CURRICULUM VITAE

ALEXANDER WIREKO KENA, PhD

(SENIOR LECTURER)

**DEPARTMENT OF CROP AND SOIL SCIENCES,
FACULTY OF AGRICULTURE,
COLLEGE OF AGRICULTURE AND NATURAL RESOURCES
KNUST, KUMASI**

JUNE 2023

CURRICULUM VITAE

Alexander Wireko Kena, PhD.

Department of Crop and Soil Sciences
Faculty of Agriculture
College of Agriculture and Natural Resources
Kwame Nkrumah University of Science and Technology
Kumasi-Ghana

ORCID ID: <https://orcid.org/0000-0003-3385-4945>

Mobile: +233551757047; +233504688497
Email: awkena@knust.edu.gh; alex.kena24@gmail.com

Dr. Alexander Wireko Kena is a Plant Breeder and Molecular Geneticist in the Department of Crop and Soil Sciences, Kwame Nkrumah University of Science and Technology (KNUST), Kumasi, Ghana. He envisions an Africa with a high quality of life for its people, where there is zero hunger and malnutrition. To achieve this, he leverages existing technologies and innovates new tools to improve crop performance in a sustainable manner for climate resilience and higher productivity. His research utilizes goal-directed and hypothesis-driven approaches to make significant contributions to knowledge. He has co-authored peer-reviewed publications in reputable journals and several academic conference papers. He has worked as a Research Scholar in the Crop Adaptation Lab in the Department of Soil and Crop Sciences, Colorado State University, Fort Collins USA. He recently underwent a professional development and training program in plant breeding offered by the University of California, Davis, and graduated from the African Plant Breeding Academy. In addition to his primary expertise in breeding and genetics, Dr. Kena is actively involved in open-source software development using R programming to make user-friendly and accessible software to agricultural researchers to drive genetic gain. Dr. Kena teaches graduate and undergraduate-level courses in genetics, plant breeding, statistics, and molecular genetics. He co-leads breeding programs that seek to develop climate-smart varieties in maize, cowpea, millet, groundnut, and rice.

1. EDUCATIONAL BACKGROUND

a. (i) Academic degrees earned with dates

Table 1.1: Academic Qualifications with dates

Academic Qualifications	Date
Doctor of Philosophy (Plant Science) , South Dakota State University, Brookings – USA	May 2017
Master of Science (Agronomy, Plant Breeding option) , University of Ibadan, Ibadan – Nigeria	November 2011
Bachelor of Science in Agriculture , Kwame Nkrumah University of Science and Technology, Kumasi-Ghana	June 2008

b. (i) Institutions attended with dates

Table 1.2: Institutions attended with dates

Name of Institution	Date
South Dakota State University, Brookings – USA	August 2013 to May 2017
University of Ibadan, Ibadan – Nigeria	January 2010 to November 2011
Kwame Nkrumah University of Science and Technology, Kumasi-Ghana	August 2004 to June 2008

(ii) International Awards

Table 1.3: International Awards

Fellowships	Date
Scholars exchange programme, 24-month position as Research Associate IV at Colorado State University, Fort Collins, CO – USA	April 2022 to June 2023
The African Orphan Crops Consortium (AOCC) fellowship to attend the African Plant Breeding Academy (Class IV), University of California, Davis, CA, USA	May 2018 to December 2019
Graduate Research/Teaching Assistantship, South Dakota State University, Brookings – USA	August 2013 to May 2017
The Alliance for a Green Revolution in Africa (AGRA) scholarship award – MSc Scholarship, University of Ibadan, Ibadan – Nigeria	January 2010 to November 2011

2. UNIVERSITY TEACHING AND/ OR RESEARCH EXPERIENCE WITH DATES

a. (i) Academic ranks / Position(s) held

Table 2.1: Academic ranks / Position held

Academic ranks / Position held	Date
Senior Lecturer , Department of Crop and Soil Sciences, Faculty of Agriculture	August 01, 2022 to date
Lecturer , Department of Crop and Soil Sciences, Faculty of Agriculture	August 01, 2018 to July 31, 2022
Assistant Lecturer , Department of Crop and Soil Sciences, Faculty of Agriculture (Granted leave of absence to pursue my doctoral study from August 2013 to August 2017)	August 31, 2012 to July 31, 2018

ii. Subjects taught since my last Promotion (2018)

Table 2.2: Postgraduate Level Courses Taught

Postgraduate Level		
Courses Taught	Department	Date
CS 558: Adavanced Plant Biotechnology (MPhil & PhD)	Department. of Crop and Soil Sciences	2012 - date
CS 586: Quantitative Genetics for Plant Breeding (MPhil & PhD)	Department. of Crop and Soil Sciences	2018 - date
CS 582: Quantitative Methods (MPhil & PhD)	Department. of Crop and Soil Sciences	2018 - date
CS 565: Research Methods (MPhil & PhD)	Department. of Crop and Soil Sciences	2021 - date

Table 2.3: Undergraduate Level Courses Taught

Undergraduate Level		
Courses Taught	Department	Date
CS 159: Genetics	Department. of Crop and Soil Sciences	2012 to date
AGB 151: Introduction to Agricultural Biotechnology	Department. of Crop and Soil Sciences	2017 to 2020
AGB 155: Fundamental Laboratory Techniques	Department. of Crop and Soil Sciences	2017 to 2020
CS 253: Principles of Plant Breeding	Department. of Crop and Soil Sciences	2012 to 2020
AGB 253: Introduction to Molecular Genetics	Department. of Crop and Soil Sciences	2017 to date
AGB 254: Methods in Molecular Biology	Department. of Crop and Soil Sciences	2013 to 2020
AGB 258: Plant Genetic Resources Conservation	Department. of Crop and Soil Sciences	2013 to 2020
AGB 353: Techniques in Molecular Genetics	Department. of Crop and Soil Sciences	2017 to date
AGB 352: Plant biotechnology	Department. of Crop and Soil Sciences	2017 to 2020

CS 458: Plant Biotechnology	Department. of Crop and Soil Sciences	2013 to date
CS 461: Plant Breeding	Department. of Crop and Soil Sciences	2017 to date

Service course taught

Table 2.3: Service Courses Taught

Courses Taught	Department	Date
MIP 559: IP on Biotechnology, Public Health, Food Security, Plant Breeder's Right (MPhil)	Department. of Agricultural and Biosystems Engineering	2019 - date
HORT 558: Research Methods (MPhil)	Department. of Horticulture (IDL)	2021 to date

b. Supervision of students' project work/theses/research

Summary of students' project work/theses/research since my last promotion

- Nine (9) PhD Students (3 completed; 6 ongoing)
- Eight (8) MPhil Students (5 completed; 3 ongoing)
- Sixteen (16) BSc. Dissertations (13 completed; 3 ongoing)

c. Other professionally related experience(s)

January 1, 2021 to Date: **Assistant Faculty Examinations Officer**, Faculty of Agriculture, KNUST.

Dec. 1, 2019 to Dec. 31, 2020: **Faculty Coordinator for Marking MCQs**, Faculty of Agriculture, KNUST.

Feb. 1, 2019 to Nov. 30, 2019: **Assistant Faculty Coordinator for Marking MCQs**, Faculty of Agriculture, KNUST.

Aug. 30, 2019 to Date: **Postgraduate Coordinator**, Department of Crop and Soil Sciences, KNUST.

Sept. 15, 2017 to Date: **Patron**, Association of Agricultural Biotechnology Students (AABS) KNUST.

August 31, 2012 to Date: **Hall fellow**, University Hall, KNUST.

November 5, 2018 – date: **External Assessor**, University for Development Studies, Tamale

- March 5, 2020 to Date: **Reviewer**, Ghana Journal of Agricultural Science (GJAS), Accra
- April 18, 2019: **Speaker**, Career Counselling Day, Fijai Senior High School, Takoradi.
- Nov. 12, 2020 to July 7, 2021: **Chairman/member**, Committee for Development of a Start-up Business plan (1D1S) for the Department of Crop and Soil Sciences, KNUST.
- Sept. 18 - 30, 2020 : **Chairman/member**, Committee for selecting MPhil applicants for admission into postgraduate degree programmes in the Department of Crop and Soil Sciences, KNUST.
- October 7, 2020: **Member**, Accreditation Committee, Departement of Crop and Soil Sciences, KNUST.
- Sept. 14, 2020 to Oct. 30, 2020: **Secretatry/member** of Committee for industry and alumni relations of the Faculty of Agriculture, KNUST
- Aug. 30, 20219 to Sep. 30, 2019: **Secretary/member**, Committee for development of IDL programme in MPhil Crop Science in the Department of Crop and Soil Sciences, KNUST
- Jun. 28, 2019 to Aug. 1, 2019: **Secretary/member**, Committee for the development of curriculum for Ph.D. Plant Breeding programme in the Department of Crop and Soil Sciences, KNUST.
- May 5, 2021: **External Assessor**, Panel for Appointments and Promotions Board, Akenten Appiah-Menka University of Skills Training and Entrepreneurial Development, Kumasi.

3. DETAILS OF RESEARCH/PROJECTS UNDERTAKEN SINCE LAST PROMOTION

a. Research conducted (topics with dates)

Research studies conducted since my last appointment are presented in Tables 3.1 and 3.2 below.

Table 3.1. Research conducted - On-going

S/N	Title of Research	Date

1	Breeding Cowpea [<i>Vigna unguiculata</i> (L)Walp.] for resistance to <i>Striga gesnerioides</i> using molecular tools	December 2020 to Date
2	Combining ability and characterization of yellow maize (<i>Zea mays</i> L.) inbred lines for low soil nitrogen tolerance	January 2022 to Date
3	Breeding for drought tolerant and low-p common bean varieties in Ghana	August 2019 to Date
4	Genetic control of earliness in cowpea [<i>Vigna unguiculata</i> (L)Walp.]	August 2019 to Date
5	Heterotic grouping of tropical and temperate yellow maize (<i>Zea mays</i> L.) inbred lines for hybrid cultivar development	September 2020 to September 2021
6	Development of high yielding maize hybrids with tolerance to drought and low soil nitrogen	January 2022 to Date
7	Development of AI-based imagery tools for phenotyping crop traits	June 2022 to Date
8	Development of web apps to enhance teaching and learning of molecular genetics and systematics	September 2021 to Date
9	The <i>qrlablr</i> package: a faster user-friendly software for designing customized print-ready machine and human-readable plot labels	December 2022 to Date

Table 3b. Research conducted – Completed

S/N	Title of Research	Date
1	Studies of genetic control and development of Pro-Vitamin A maize hybrids in Ghana	January 2013 to September 2017
2	Inheritance and genetic analysis of drought and late leaf spot (<i>Phaeoisariopsis personata</i>) disease tolerance in groundnut (<i>Arachis hypogaea</i> L.)	August 2013 to December 2017
3	Breeding for tolerance to salt stress in rice using a new tolerance donor, <i>Madina koyo</i>	January 2014 to February 2018
4	Pyramiding of two different sources of Aphid resistance genes into farmer-preferred cowpea varieties in Ghana	January 2015 to September 2021
5	Farmer preference, combining ability and yield stability for high grain Fe and Zn content of early maturing pearl millet [<i>Pennisetum glaucum</i> , (L), R. Br] genotypes in Ghana	August 2017 to September, 2021
6	Development of extra-early maturing, <i>Striga gesnerioides</i> (L.) Wild) and <i>Aphis craccivora</i> (Koch) resistance cowpea (<i>Vigna unguiculata</i> (L.) Walp) varieties using marker-assisted backcrossing	September 2018 to May 2022
7	Assessment of genetic gain for yield and yield related traits of released rice varieties in Ghana	July 2020 to July 2021

8	Modeling groundnut (<i>Arachis hypogaea</i> L.) performance under drought conditions	June 2017 to May 2018
9	Silencing seed dormancy genes to mitigate risk of transgene flow to weedy rice	September 2013 to August 2017
10	Assembling seed dormancy genes into a system identified their effects on seedbank longevity in weedy rice	September 2014 to August 2018
11	Colchicine-enabled genomic doubling in oil palm (<i>Elaeis guineensis</i> Jacq.)	September 2016 to August 2020
12	Molecular and phenotypic characterization of cassava (<i>Manihot esculenta</i> Crantz) germplasm in the semi-deciduous forest ecology of Ghana	June 2017 to May 2018
13	Mode of inheritance and combining ability of oleic acid content in groundnut (<i>Arachis hypogaea</i> L.)	September 2017 to August 2020

4. CONFERENCES/SEMINARS AND WORKSHOPS AT WHICH PAPERS WERE READ

Table 4.1: List of Conferences at which papers read

S/N	Conference/ seminar	Papers presented	Date
1	American Society of Plant Biologists Midwestern Section Annual Meeting, at South Dakota State University, Brookings, SD, USA	Alexander Kena , Heng Ye, Jiuhuan Feng, and Xingyou Gu. 2016. Mutagenesis of genes associated with seed dormancy in rice (<i>Oryza sativa</i> L.) using two CRISPR/Cas9 multiplex systems.	March 19 - 20, 2016
2	ASA-CSSA-SSSA International Annual Meeting, at Minneapolis Convention Center, Minneapolis, MN, USA	Alexander Kena , Heng Ye, Jiuhuan Feng, Fatma Ismail and Xingyou Gu. 2015. Silencing seed dormancy genes to mitigate risk of transgene flow to weedy rice	Nov. 15 – 18, 2015

5. LIST OF ALL PUBLICATIONS

i. Publications with exact references

1. Adu Amoah, R., Akromah, R., Asibuo, J.Y., **Kena, A.W**, Asare, K.B., Lamptey, M., Adu Gyamfi, B., 2020. Mode of inheritance and combining ability of oleic acid content in groundnut (*Arachis hypogaea* L.). *Ecological Genetics and Genomics* 17, 100064. <https://doi.org/10.1016/j.egg.2020.100064>
2. Adu, B.G., Yeboah, A., Akromah, R., Bobobee, E., Amoah, S., **Kena, A.W.**, Amoah, R.A., 2020. Whole genome SNPs and phenotypic characterization of cassava (*Manihot esculenta* Crantz) germplasm in the semi-deciduous forest ecology of Ghana. *Ecological Genetics and Genomics* 100068. <https://doi.org/10.1016/j.egg.2020.100068>
3. Adu, G.B., Akromah, R., Abdulai, M.S., **Kena, A.W.**, Tengan, K.M.L., Alidu, H., 2013.

- Assessment of Genotype by Environment interactions and Grain Yield Performance of Extra-Early Maize (*Zea mays* L.) Hybrids. *Journal of Biology, Agriculture and Healthcare* 3, 7–15.
4. Amoah, N.K.A., Akromah, R., **Kena, A.W.**, Manneh, B., Dieng, I., Bimpong, I.K., 2020. Mapping QTLs for tolerance to salt stress at the early seedling stage in rice (*Oryza sativa* L.) using a newly identified donor ‘Madina Koyo.’ *Euphytica* 216, 156. <https://doi.org/10.1007/s10681-020-02689-5>
 5. Annor, B., **Kena, A.W.**, Asare Bediako, K., 2023. Variability among West African okra (*Abelmoschus spp.* L.) accessions based on quantitative traits. *Ecological Genetics and Genomics* 26, 100156. <https://doi.org/10.1016/j.egg.2022.100156>
 6. Appiah-Kubi, D., Asibuo, J.Y., Butare, L., Yeboah, S., Appiah-Kubi, Z., **Kena, A.W.**, Tuffour, H.O., Akromah, R., 2022. Heat Stress Tolerance: A Prerequisite for the Selection of Drought- and Low Phosphorus-Tolerant Common Beans for Equatorial Tropical Regions Such as Ghana. *Plants* 2022, Vol. 11, Page 2352 11, 2352. <https://doi.org/10.3390/PLANTS11182352>
 7. Asare, S., **Kena, A.W.**, Amoah, S., Annor, B., Osekre, E.A., Akromah, R., 2023. Screening of maize inbred lines and evaluation of hybrids for their resistance to fall armyworm. *Plant Stress* 8, 100148. <https://doi.org/10.1016/j.stress.2023.100148>
 8. Asungre, P.A., Akromah, R., **Kena, A.W.**, Gangashetty, P., 2022. Assessing the adaptability and stability of new pearl millet hybrids for grain yield, grain iron and zinc content in Ghana using AMMI analysis. *Journal of Crop Science and Biotechnology* 2022 1–14. <https://doi.org/10.1007/S12892-022-00147-3>
 9. Asungre, P.A., Akromah, R., **Kena, A.W.**, Gangashetty, P., 2021a. Assessing production constraints, management and use of pearl millet in the Guinea Savanna Agro-ecology of Ghana. *African Journal of Plant Science* 15, 288–298. <https://doi.org/10.5897/AJPS2021.2183>
 10. Asungre, P.A., Akromah, R., **Kena, A.W.**, Gangashetty, P., 2021b. Genotype by Environment Interaction on Grain Yield Stability and Iron and Zinc Content in OPV of Pearl Millet in Ghana Using the AMMI Method. *International Journal of Agronomy* 2021, 1–10. <https://doi.org/10.1155/2021/9656653>
 11. Danful, R., Kassim, Y.B., Puozaa, D.K., Oteng-Frimpong, R., Rasheed, M.A., **Kena, A.W.**, Akromah, R., 2019. Genetics of Stay-Green Trait and Its Association with Leaf Spot Tolerance and Pod Yield in Groundnut. *International Journal of Agronomy* 2019, 1–11. <https://doi.org/10.1155/2019/3064026>
 12. **Kena, A.W.**, 2017. Silencing Seed Dormancy Genes to Mitigate Risk of Transgene Flow to Weedy Rice. *Electronic Theses and Dissertations*. South Dakota State University.
 13. **Kena, A.W.**, Ewool, M.B., Akromah, R., 2021. Development of High Pro-Vitamin A Enriched Hybrid Maize Varieties in Ghana, in: Acquaaah, G. (Ed.), *Principles of Plant Genetics and Breeding*. John Wiley and Sons, West Sussex, pp. 232–235.
 14. Nelimor, C., Sintim, H.Y., **Kena, A.W.**, Akromah, R., 2017. Using Surface Response Models to Evaluate the Effects of Kinetin on *Dioscorea alata* Propagated in Vitro. *Journal of Agricultural Science and Technology B* 7, 69–78. <https://doi.org/10.17265/2161-6264/2017.02.001>
 15. Obeng, J., Tuyee Awuah, R., **Kena, A.W.**, Armooh, B., 2021. Identification of an *Aspergillus* isolate with potential for biocontrol of *Phytophthora palmivora*, causal agent of black pod disease of cocoa. *Journal of Crop Protection* 10, 375–390.
 16. Oteng-Frimpong, R., Kassim, Y.B., Danful, R., Akromah, R., **Kena, A.W.**, Forson, S., 2019. Modeling groundnut (*Arachis hypogaea* L.) performance under drought conditions. *Journal of Crop Improvement* 33, 125–144. <https://doi.org/10.1080/15427528.2018.1542363>

17. Owusu, E.Y., Kusi, F., **Kena, A.W.**, Akromah, R., Attamah, P., Awuku, F.J., Mensah, G., Lamini, S., Zakaria, M., 2022a. Genetic control of earliness in cowpea (*Vigna unguiculata* (L) Walp). *Heliyon* 8, e09852. <https://doi.org/10.1016/J.HELIYON.2022.E09852>
18. Owusu, E.Y., Kusi, F., **Kena, A.W.**, Akromah, R., Awuku, F.J., Attamah, P., Mensah, G., 2022b. Generation mean analysis of the key earliness related traits in cowpea (*Vigna unguiculata* (L.) Walp). *Scientific African* 17, e01289. <https://doi.org/10.1016/J.SCIAF.2022.E01289>
19. Owusu, E.Y., Kusi, F., **Kena, A.W.**, Akromah, R., Awuku, F.J., Attamah, P., Mensah, G., Lamini, S., 2022c. Parental evaluation, polymorphic loci marker survey and allelism study of earliness in cowpea (*Vigna unguiculata* (L.) Walp). *Ecological Genetics and Genomics* 25, 100146. <https://doi.org/10.1016/J.EGG.2022.100146>
20. Pipatpongpinoy, W., Korkmaz, U., Wu, H., **Kena, A.W.**, Ye, H., Feng, J., Gu, X.Y., 2019. Assembling seed dormancy genes into a system identified their effects on seedbank longevity in weedy rice. *Heredity*. <https://doi.org/10.1038/s41437-019-0253-8>
21. Savolainen, V., Clottey, V.A., Doubi, B.T.S., Konan, J.L., Quain, M., Bezeng, B.S., Logah, V., **Kena, A.W.**, Osekre, E.A., Atuah, L., Angui, C.M.V., Ameka, G., Turkson, B., Boatemaa, A., Anankware, J.P., Bofo, H.A., Agyei-Dwarko, D., Collins, C.M. (Tilly), 2020. Systems thinking creates opportunities for a circular economy and sustainable palm agriculture in Africa. *Current Research in Environmental Sustainability*. <https://doi.org/10.1016/j.crsust.2020.05.001>
22. Suza, W.P., **Kena, A.W.**, Akromah, R., Mugwanya, N., Zeller, M.F., 2018. Fear holds back gene-edited crops - educate the public. *Nature* 563, 626. <https://doi.org/10.1038/d41586-018-07547-y>

6. RECORD OF SERVICE TO THE COMMUNITY

Table 6.1: List of Services rendered to the Community

a. Service to the University	Period
i. Administrative experience	
Assistant Faculty Examinations Officer , Faculty of Agriculture, KNUST.	January 1, 2021 to date
Faculty Coordinator for Marking MCQs , Faculty of Agriculture, KNUST.	Dec. 1, 2019 to Dec. 31, 2020
Assistant Faculty Coordinator for Marking MCQs , Faculty of Agriculture, KNUST	Feb. 1, 2019 to Nov. 30, 2019
Postgraduate Coordinator , Department of Crop and Soil Sciences, KNUST	Aug. 30, 2019 to date

Patron , Association of Agricultural Biotechnology Students (AABS) KNUST	Sept. 15, 2017 to date
Hall fellow , University Hall, KNUST	August 31, 2012 to Date
ii. Statutory and non-statutory (Membership & positions held)	
Chairman	
Committee for Development of a Start-up Business plan (1D1S) for the Department of Crop and Soil Sciences, KNUST	Nov. 12, 2020 to July 7, 2021
Committee for selecting MPhil applicants for admission into postgraduate degree programmes in the Department of Crop and Soil Sciences, KNUST	Sept. 18 - 30, 2020
Secretary	
Committee for industry and alumni relations of the Faculty of Agriculture, KNUST	Sept. 14, 2020 to Oct. 30, 2020
Committee for development of IDL programme in MPhil Crop Science in the Department of Crop and Soil Sciences, KNUST	Aug. 30, 2019 to Sep. 30, 2019
Committee for the development of curriculum for Ph.D. Plant Breeding programme in the Department of Crop and Soil Sciences, KNUST	Jun. 28, 2019 to Aug. 1, 2019
Member	
Accreditation Committee, Department of Crop and Soil Sciences, KNUST	October 7, 2020
Tutorship/ Mentorship	
Academic Tutor, Faculty of Agriculture, KNUST.	

iii. Financial/ Material Resource Mobilisation	
i. Financial Resources	
Student exchange programme in collaboration with the University of Arkansas at Pine Bluff, USA, funded by 1890 Centre of Excellence for International Engagement and Development (CEIED) US\$ 11,171	June 17 to July 1, 2022
Total Financial Mobilization = US\$ 11,171	
ii. Material Resource Mobilisation	
Co-led BSc. Agriculture Class of 2008 to donate two (2) 75-inch Smart TV screens, TV wall mounts, HDMI and VGA splitter and cables, installation cables, other accessories, and laser pointer to the College of Agriculture and Natural Resources https://canr.knust.edu.gh/node/121 GHC15,000	July 23, 2021
b. Service to National & International Communities	
Speaker , Career Counselling Day, Fijai Senior High School, Takoradi.	April 18, 2019
Resource person , Improved MSc in Cultivar Development for Africa (IMCDA) Dissemination and Scale-Out Workshop, Southern Sun Hotel, Dar es Salaam, Tanzania	July 2 - 4, 2019
Invited Speaker , University of California African Plant Breeding Academy (Class V).	May 21 - 23, 2022
i. Reviewer for local & international journal	

External Assessor , University for Development Studies, Tamale	November 5, 2018 – date
Reviewer , Ghana Journal of Agricultural Science (GJAS), Accra	March 5, 2020 to date
iii. Membership of Professional Associations	
University Teachers Association of Ghana (UTAG)	October 2010 – date
Crop Science Society of America (CSSA)	November 2015 to date
American Society of Plant Biologists (ASPB)	March 2016 to date
African Plant Breeders Association	October 2019 to date