

DAFTAR PUSTAKA

- Abunyewa, A.A., R.B. Ferguson, C.S. Wortmann, and S.C Mason. 2017. Grain sorghum nitrogen use as affected by planting practice and nitrogen rate. *Journal of Soil Science and Plant Nutrition*. 17(1): 155-166.
- Adhi. J.W.S., S. Darmanti, dan E. Saptaningsih. 2024. Pertumbuhan vegetatif tanaman sorgum (*Sorghum bicolor* L. Moench) var. Suri 4 dengan perlakuan nanosilika. *Buletin Anatomi dan Fisiologi*. 9(2): 186-192.
- Adinurani, P.G., S. Rahayu, L.S. Budi, and R.H. Setyobudi. 2020. Adaptation and phenotype varieties of sweet sorghum (*Sorghum bicolor* Linn. Moench) at different altitude. *International Journal on Advanced Science Engineering Information Technology*. 10(6): 2429-2434.
- Adrian, R., Agustiansyah, A. Junaidi, dan D.I. Lestari. 2022. Aplikasi pengukuran luas daun tanaman menggunakan pengolahan citra digital berbasis android. *Jurnal Agrotropika*. 21(2): 115-123.
- Affoh, R., H. Zheng, X. Zhang, W. Yu, and C. Qu. 2023. Influence of meteorological factors on maize and sorghum yield in Togo, West Africa. *Land*. 12(1): 1-24.
- Akoglu, H. 2018. User's guide to correlation coefficients. *Turkish Journal of Emergency Medicine*. 18(3): 91-93.
- Alkhairi, M., Suwardji, dan L.A.A. Bakti. 2024. Respon pertumbuhan tanaman sorgum (*Sorghum bicolor* (L.) Moench) terhadap penggunaan cocopeat, pupuk kandang sapi dan pupuk silikat di lahan kering Lombok Utara. *Journal of Soil Quality and Management*. 1(1): 23-31.
- Amiri, M., M. Mojaddam, A. Shokouhfar, and N. Bakhtiarinejad. 2014. The effect of different levels and time of nitrogen application on grain yield, some physiological traits and nitrogen use efficiency in grain sorghum. *Indian Journal of Fundamental and Applied Life Sciences*. 4(3): 223-227.
- Anas, M., F. Liao, K.K. Verma, M.A. Sarwar, A. Mahmood, Z. Chen, Q. Li, X. Zeng, Y. Liu, and Y. Li. 2020. Fate of nitrogen in agriculture and environment: agronomic, eco-physiological and molecular approaches to improve nitrogen use efficiency. *Biological Research*. 53(47): 1-20.
- Aryani, N.F., K. Khatimah, F.N. Tajuddin, A.I. Khairunnisa, N. Magfira, dan N.W. Aminuddin. 2022. Budidaya Tanaman Sorgum (*Sorghum bicolor* L. Moench). Jurusan Biologi FMIPA UNM. Makassar.
- Assefa, Y., J.D. Holman, A.K. Obour, D. O'Brien, and P.V.V. Prasad. 2024. Historic grain sorghum production, value, yield gap, and weather relation trends. *Agronomy*. 14(11): 1-18.

- Asie, E.R., Eliyani, A.P.D. Nazari, E. Adelina, I. Sriwahyuni, E.Y. Hosang, E.D. Sulichantini, S.A. Lasmini, A. Ninasari, M. Ansar, Maemunah, S.M. Sari, dan A. Jalil. 2024. Analisis Pertumbuhan Tanaman. CV Hei Publishing Indonesia. Padang.
- AuBuchon-Elder, T., V. Coneva, D.M. Goad, L.M. Jenkins, Y. Yu, D.K. Allen, and E.A. Kellog. 2020. Sterile spikelets contribute to yield in sorghum and related grasses. *The Plant Cell*. 32: 3500-3518.
- Ayiti, O.E. and O.O. Babalola. 2022. Factors influencing soil nitrification process and the effect on environment and health. *Frontiers in Plant Science*. 6: 1-12.
- Badan Pangan Nasional. 2025. Hilirisasi sorgum, langkah strategis Badan Pangan Nasional wujudkan swasembada pangan. <<https://badanpangan.go.id>>. Diakses pada 28 Oktober 2025.
- Badan Standardisasi Instrumen Pertanian. 2023. Analisis Kimia Tanah, Tanaman, Air, dan Pupuk. Kementerian Pertanian. Bogor.
- Badan Standardisasi Nasional. 2024. RSNI 7763:2024 - Pupuk organik padat. Rancangan Standar Nasional Indonesia 3. Jakarta.
- Balaine, N., T.J. Clough, and F.M. Kelliher. 2013. Effect of Soil Aeration Status on The Degradation of DCD in Soil. Ministry for Primary Industries. New Zealand.
- Bao, W., P. He, L. Han, X. Wei, L. Feng, J. Zhu, J. Wang, X. Yang, and L. Li. 2024. Soil nitrogen availability and microbial carbon use efficiency are dependent more on chemical fertilization than winter drought in a maize–soybean rotation system. *Frontiers in Microbiology*. 15: 1-13.
- Bista, P., M. Eisa, D. Ragauskaitė, S. Sapkota, J. Baltrusaitis, and R. Ghimire. 2023. Effect of urea-calcium sulfate cocrystal nitrogen fertilizer on sorghum productivity and soil N₂O emissions. *Sustainability*. 15(10): 1-15.
- Bollam, S., K.K. Romana, L. Rayaprolu, A. Vemula, R.R. Das, A. Rathore, P. Gandham, G. Chander, S.P. Deshpande, and R. Gupta. 2021. Nitrogen use efficiency in sorghum: exploring native variability for traits under variable n-regimes. *Frontiers in Plant Science*. 12: 1-19.
- Bosire, E. and F. Karanja. 2018. Effects of nitrogen and phosphorus application rates on growth and yield of two sorghum cultivars in semi-arid Eastern Kenya case study of Machakos County. *International Journal of Plant & Soil Science*. 26(4): 1-15.
- Bozal-Leorri, A., G.V. Subbarao, M. Kishii, L. Urmeneta, V. Kommerell, H. Karwat, HJ. Braun, PM. Aparicio-Tejo, I. Ortiz-Monasterio, C. Gonzales-Murua, and MB. Gonzales-Moro. 2023. Biological nitrification inhibitor-trait enhances nitrogen uptake by suppressing nitrifier activity and improves ammonium assimilation in two elite wheat varieties. *Frontiers in Plant Science*. 13: 1-17.

- Byrne, M.P., J.T. Tobin, P.J. Forrestal, M. Danaher, C.G. Nkwonta, K. Richards, E. Cummins, S.A. Hogan, and T.F. O’Callaghan. 2020. Urease and nitrification inhibitors—as mitigation tools for greenhouse gas emissions in sustainable dairy systems: a review. *Sustainability*. 12: 1-34.
- Cabrera-Ariza, A.M., M. Aguilera-Peralta, and R. Santelices-Moya. 2024. Comparative efficiency of nitrogen fertilization levels in two sorghum hybrids for bioenergy production. *Agronomy*. 14(9): 1-12.
- Cahalan, E., E. Minet, M. Ernfors, C. Muller, D. Devaney, P.J. Forrestal, and K.G. Richards. 2025. The effect of precipitation and application rate on dicyandiamide persistence and efficiency in two Irish grassland soils. *Soil Use and Management*. 31(3): 367-374.
- Cai, F., N. Mi, H. Ming, Y. Zhang, H. Zhang, S. Zhang, X. Zhao, and B. Zhang. 2023. Responses of dry matter accumulation and partitioning to drought and subsequent rewatering at different growth stages of maize in Northeast China. *Frontiers in Plant Science*. 14: 1-15.
- Ciftci, B., I.S. Varol, S. Akcura, Y.M. Kardes, S. Karaman, and M. Kaplan. 2025. Morphological and nutritional responses of sorghum to variable irrigation levels and nitrogen doses. *Plos One*. 20(6): 1-19.
- Congreves, K.A., O. Otchere, D. Ferland, S. Farzadfar, S. Williams, and M.M. Arcand. 2021. Nitrogen use efficiency definitions of today and tomorrow. *Frontiers in Plant Science*. 12: 1-10.
- Cui, L., D. Li, Z. Wu, Y. Xue, F. Xiao, L. Zhang, Y. Song, Y. Li, Y. Zheng, J. Zhang, and Y. Cui. 2021. Effects of nitrification inhibitors on soil nitrification and ammonia volatilization in three soils with different pH. *Agronomy*. 11(8): 1-13.
- Dewi, E.S. dan M. Yusuf. 2017. Potensi pengembangan sorgum sebagai pangan alternatif, pakan ternak, dan bioenergi di Aceh. *Jurnal Agroteknologi*. 7(2): 27-32.
- DPKP. 2019. Deskripsi sorgum varietas Bioguma 2 Agritan. <<https://dpkp.jogjaprovo.go.id/detailbenih/Sorghum+Varietas+Bioguma+2+Agritan/190523/f7a01e7ba4dc76a1ddf5f7f510feef1d05510f2469ce9fb080ad2790cd90e805734>>. Diakses pada 12 Agustus 2025.
- Dudato, G.M., Ch.L. Kaunang, M.M. Telleng, dan C.I.J. Sumolang. 2020. Karakter agronomi sorgum varietas Samurai II fase vegetatif yang ditanam pada jarak tanam berbeda. *Zootec*. 40(2): 773-780.
- Ermakova, M., R. Woodford, Z. Taylor, R.T. Furbank, S. Belide, and S. von Caemmerer. 2023. Faster induction of photosynthesis increases biomass and grain yield in glasshouse-grown transgenic *Sorghum bicolor* overexpressing Rieske FeS. *Plant Biotechnology Journal*. 21(6): 1206-1216.

- Fathoni, M.Z., E. Ismiyah, dan P. Sudirdjo. 2020. Pelatihan pembuatan dan penggunaan pupuk pada tanaman di SMA Muhammadiyah 3 Bungah Gresik. *Jurnal Pengabdian Masyarakat*. 1(2): 127-133.
- Fauzi, A., W. Cahyani, I. Widiyawati, dan S.N. Hadi. 2024. Efisiensi pupuk nitrogen dan pertumbuhan sorgum pada tanah ultisol dengan pemanfaatan kompos baglog jamur. *Jurnal Agrotek Tropika*. 12(1): 21-28.
- Fiqriansyah, M., S.A. Putri, R. Syam, A.S. Rahmadani, T.N. Frianie, S. Anugrah, Y.I. Sari, A.N. Adhayani, Nurdiana, Fauzan, N.A. Bachok, A.M. Manggabarani, dan Y.D. Utami. 2021. Teknologi Budidaya Tanaman Jagung (*Zea mays*) dan Sorgum (*Sorghum bicolor* (L.) Moench). Jurusan Biologi FMIPA UNM. Makassar.
- Flynn, R., S.T. Ball, and R.D. Baker. 1999. Sampling for plant tissue analysis. New Mexico State University, Cooperative Extension Service. Guide A-123: 1-8.
- French, E., J.A. Kozlowski, and A. Bollmann. 2021. Competition between ammonia-oxidizing archaea and bacteria from freshwater environments. *Microbial Ecology*. 87(20): 1-11.
- Gardner, F.P., R.B. Pearce dan R.L. Mitchell. 1991. *Physiology of Crop Plants*. Universitas Indonesia Press. Jakarta.
- Gao, J., Y. Zhang, C. Xu, P. Wang, S. Huang, and Y. Lv. 2024. Enhancing spatial and temporal coordination of soil water and root growth to improve maize (*Zea mays* L.) yield. *Agricultural Water Management*. 294: 1-10.
- Gebremariam, G. and D. Assefa. 2015. Nitrogen fertilization effect on grain sorghum (*Sorghum bicolor* L. Moench) yield, yield components and witchweed (*Striga hermonthica* (Del.) Benth) infestation in Northern Ehtiopia. *International Journal of Agricultural Research*. 10(1): 14-23.
- Gloria. 2023. PIAT UGM luncurkan pupuk super cerdas, mampu tingkatkan produksi teh hingga tiga kali lipat. <<https://ugm.ac.id/id/berita/piat-ugm-luncurkan-pupuk-super-cerdas-mampu-tingkatkan-produksi-teh-hingga-tiga-kali-lipat/>>. Diakses pada 8 Juni 2025.
- Gonzatto, R., F. Stuker, C. Aita, S.J. Giacomini, R.C. Ludtke, A. Dessbesell, D.A. Giacomini, and S.B. Pujol. 2016. Dicyandiamide as nitrification inhibitor of pig slurry ammonium nitrogen in soil. *Ciencia Rural Santa Maria*. 46(5): 802-808.
- Govindasamy, P., S.K. Muthusamy, M. Bagavathiannan, J. Mowrer, P.T.K. Jagannadham, A. Maity, H.M. Halli, G.K. Sujayanad, R. Vadivel, T.K. Das, R. Raj, V. Pooniya, S. Babu, S.S. Rathore, L. Muralikrishnan, and G. Tiwari. 2023. Nitrogen use efficiency—a key to enhance crop productivity under a changing climate. *Frontiers in Plant Science*. 14: 1-19.
- Harmini. 2021. Pemanfaatan tanaman sorgum sebagai pakan ternak ruminansia di lahan kering. *Livestock and Animal Research*. 19(2): 159-170.

- Holman, J.D., D.A.R. Diaz, A.K. Obour, and Y. Assefa. 2023. Nitrogen fertilizer source, rate, placement, and application timing effect on sorghum (grain and forage) and corn grain yields. *Agrosystems, Geosciences, & Environment*. 7: 1-16.
- Hunter, M.A., M.J. Bell, F.J.T. van der Bom, M.R. Smith, C.K. Janke, and T.I. McLaren. 2024. The spatial distribution of soil nitrogen determines responses of *Sorghum bicolor* to banded phosphorus fertilizer. *Crop and Pasture Science*. 75(12): 1-11.
- Jo'rayeva, O.T. 2025. Effect of moisture levels on the physiological characteristics of sorghum. *European Journal of Agricultural and Rural Education*. 6(3): 3-5.
- Justitia, S.B., Y.S.J. Santosa, dan S. Bahri. 2021. Kajian dosis pupuk urea dan pupuk kandang ayam terhadap pertumbuhan dan hasil tanaman sorgum manis (*Sorghum bicolor* L. Moench). *Jurnal Inovasi Pertanian*. 23(2): 155-164.
- Karthika, K.S., K.S.A. Kumar, R. Srinivasan, M. Chandrakala, S. Parvathy, J. Prasad. 2024. Understanding the sorghum-growing soils in a semi-arid ecosystem of Telangana, India and assessing their land suitability for sorghum cultivation. *Indian Journal of Agricultural Research*. 58: 1100-1108.
- Khalifa, M. and E.A.B. Eltahir. 2023. Assessment of global sorghum production, tolerance, and climate risk. *Frontiers*. 7: 1-20.
- Kibet, E., C.M. Musafiri, M.N. Kiboi, J. Macharia, O.K. Ng'etich, D.K. Kosgei, B. Mulianga, M. Okoti, A. Zeila, and F.K. Ngetich. 2022. Soil organic carbon stocks under different land utilization types in Western Kenya. *Sustainability*. 14: 1-13.
- Klimczyk, M., A. Siczek, and L. Schimmelpfennig. 2021. Improving the efficiency of urea-based fertilization leading to reduction in ammonia emission. *Science of the Total Environment*. 771: 1-13.
- Knebl, L., A. Gattinger, W. Niether, and C. Brock. 2023. Uptake of fertilizer nitrogen and soil nitrogen by sorghum sudangrass (*Sorghum bicolor* × *Sorghum sudanense*) in a greenhouse experiment with ¹⁵N-labelled ammonium nitrate. *Soil Systems*. 7(3): 1-14.
- Kou, X., W. Han, and J. Kang. 2022. Responses of root system architecture to water stress at multiple levels: A meta-analysis of trials under controlled conditions. *Frontiers in Plant Science*. 13: 1-22.
- Kowal, R.R. 2017. *The Biology of Sorghum bicolor* L. Moench subsp. *bicolor* (Sorghum). Office of the Gene Technology Regulator. Australia.
- Kumawat, C., B. Yadav, A.K. Verma, R.K. Meena, R. Pawar, S.K. Kharia, R.K. Yadav, R. Bajjiya, A. Pawar, B.H. Sunil, and V. Trivedi. 2017. Recent developments in multi-nutrient extractants used in soil analysis. *International Journal of Current Microbiology and Applied Sciences*. 6(5): 2578-2584.

- Langai, B.F., I. Dewi, dan G. Riyyani. 2024. Pengaruh pemberian pupuk urea terhadap pertumbuhan dan hasil tanaman sorgum di lahan rawa lebak. *Ziraa'ah*. 49(1): 120-126.
- Lin, C. 2023. Role of inorganic fertilizers in modern agriculture: Nourishing plants with minerals. *International Journal of Manures and Fertilizers*. 11(4): 1-2.
- Liu, Y., R. Tang, G. Liu, G. Li, J. Wang, Y. Cai, Y. Kong, dan J. Yuan. 2024. Dicyandiamide addition delay nitrous oxide emission and shift its production pathway from denitrification to incomplete nitrification in maturation phase of composting. *Chemical Engineering Journal*. 495: 1-12.
- Li, Y. and M. Chen. 2015. Novel chlorophylls and new directions in photosynthesis research. *Functional Plant Biology*. 42(6): 493-501.
- Li, Y., S.H.H. Shah, and J. wang. 2020. Modelling of nitrification inhibitor and its effects on emissions of nitrous oxide (N₂O) in the UK. *Science of The Total Environment*. 709: 1-14.
- Li, Y., Y. Zhang, S.J. Chapman, and H. Yao. 2021. Biological nitrification inhibition by sorghum root exudates impacts ammonia-oxidizing bacteria but not ammonia-oxidizing archaea. *Biology and Fertility of Soils*. 57: 399-407.
- Lucas, M., J. Gil, G.P. Robertson, N.E. Ostrom, and A. Kravchenko. 2025. Changes in soil pore structure generated by the root systems of maize, sorghum, and switchgrass affect in situ N₂O emissions and bacterial denitrification. *Biology and Fertility of Soils*. 61: 367-383.
- Mahmud, K., D. Panday, A. Mergoum, and A. Missaoui. 2021. Nitrogen losses and potential mitigation strategies for a sustainable agroecosystem. *Sustainability*. 13: 1-23.
- Makruf, S.M., L.R. Ramadhani, F. Sandha, P.A.P. Rini, S.A. Najwa, A.H. Amrullah, S. Anatasta, dan A.S. Prastia. 2025. Analisis kelembaban udara terhadap tingginya suhu di Sekaran Semarang. *Jurnal Analisis*. 4(1): 93-100.
- Malalantang, S.S., L. Abdullah, P.D.M.H. Karti, I.G. Permana, and Nurmahmudi. 2019. Agronomy characteristics of several types of sorghum from radiation mutations as a ruminant animal feed provide. *IOP Conference Series: Earth and Environmental Science*. 399: 1-6.
- Mathur, S., A.V. Umakanth, V.A. Tonapi, R. Sharma, and M.K. Sharma. 2017. Sweet sorghum as biofuel feedstock: recent advances and available resources. *Biotechnology for Biofuels*. 10: 1-19.
- Miksal., Khairullah, dan Sufardi. 2024. Evaluasi ketersediaan N, P, dan K tanah sawah di Kecamatan Delima Kabupaten Pidie Provinsi Aceh. *Jurnal Ilmiah Mahasiswa Pertanian*. 9(2): 226-234.

- Mrid, R.B., R.E. Omari, and M. Nhiri. 2016. Effect of nitrogen source and concentration on growth and activity of nitrogen assimilation enzymes in roots of a Moroccan sorghum ecotype. *Plant*. 4(6): 71-77.
- Muratore, C., L. Espen, and B. Prinsi. 2021. Nitrogen uptake in plants: The plasma membrane root transport systems from a physiological and proteomic perspective. *Plants*. 10(4): 1-26.
- Murdaningsih. dan A.F.G. Uran. 2021. Kajian agronomi potensi pengembangan tanaman sorgum varietas numbu di Kabupaten Ende. *Jurnal Budidaya Pertanian*. 17(1): 23-27.
- Murtini, E.S. dan N.F. Sabilla. 2021. Sorgum dan Pemanfaatannya dalam Industri Pangan. FTP UB Press Universitas Brawijaya. Malang.
- Mustikawati, D.R., J. Barus, R.W. Arief, S.S. Girsang, and N.P.S. Ratmini. 2024. Sorghum and eco-friendly agriculture in Indonesia. *Journal of Law and Sustainable Development*. 12(7): 1-14.
- Ngidi, A., H. Shimelis, S. Abady, V. Chaplot, and S. Figlan. 2024. Genetic variation and association of yield, yield components, and carbon storage in sorghum (*Sorghum bicolor* [L.] Moench) genotypes. *BMC Genomic Data*. 25(74): 1-14.
- Ning, J., S. Ai, and L. Cui. 2018. Dicyandiamide has more inhibitory activities on nitrification than thiosulfate. *Plos One*. 13(8): 1-18.
- Norton, J. and Y. Ouyang. 2019. Controls and adaptive management of nitrification in agricultural soils. *Frontiers in Microbiology*. 10(1931): 1-18.
- NSW Department of Primary Industries (DPI). 2018. Improving sorghum yield and quality in northern NSW. Tamworth Agricultural Institute (Technical Report). 1-15.
- Nurhadiah. dan N.P. Ningrum. 2018. Pengaruh pemberian pupuk NPK mutiara terhadap pertumbuhan dan hasil tanaman sorgum (*Sorghum bicolor* L.). *Piper*. 14(27): 334-342.
- Nurharini, A.I., Supratomo, dan J. Muhidong. 2016. Pengaruh waktu panen batang sorgum manis (*Sorghum bicolor* (L) Moench) terhadap nira yang dihasilkan. *Jurnal AgriTechno*. 9(2): 100-106.
- Nyoni, N., M. Dube, S. Bhebhe, and B. Sibanda. 2022. *Sorghum Production Manual*. Lupane State University. Zimbabwe.
- Oedjjiono., R.S. Dewi, J.S. Muljowati, dan S. Lestari. 2024. Isolation and Activity of Nitrifying Bacteria in Increasing the Viability of Soil Nitrogen. *Proceeding ICMA-SURE-2024, The 6th International Conference on Multidisciplinary Approaches for Sustainable Rural Development*. 230-236.

- Ostmeyer, T.J., R.N. Bahuguna, M.B. Kirkham, S. Bean, and S.V.K. Jagadish. 2022. Enhancing sorghum yield through efficient use of nitrogen – challenges and opportunities. *Frontiers in Plant Science*. 13: 1-11.
- Pangalila, W., S.D. Runtunuwu, dan E.F. Lengkong. 2023. Pengaruh kombinasi pupuk organik dan pupuk anorganik terhadap pertumbuhan dan produksi jagung hibrida varietas JH37. *Jurnal Agroekoteknologi Terapan*. 4(2): 311-322.
- Patriani, P., H. Hafid, Hasnudi, dan R.E. Mirwandhono. 2019. *Klimatologi dan Lingkungan Ternak*. USU Press. Medan.
- Phuong, N., H. Stutzel, and R. Uptmoor. 2013. Quantitative trait loci associated to agronomic traits and yield components in a *Sorghum bicolor* L. Moench RIL population cultivated under pre-flowering drought and well-watered conditions. *Agricultural Sciences*. 4(12): 1-11.
- Prabawa, S., A. Zoelnanda, C. Anam, dan Samanhudi. 2023. Evaluasi kualitas sensoris dan fisikokimia mi basah sorgum (*Sorghum bicolor* L. Moench) sebagai pangan fungsional. *Jurnal Teknologi Hasil Pertanian*. 16(1): 13-28.
- Prasad, V.B.R., M. Govindaraj, M. Djanaguiraman, I. Djalovic, A. Shailani, N. Rawat, S.L. Singla-Pareek, A. Pareek, and P.V.V. Prasad. 2021. Drought and high temperature stress in sorghum: physiological, genetic, and molecular insights and breeding approaches. *International Journal of Molecular Sciences*. 22(18): 1-25.
- Pugh, N.A., D.W. Horne, S.C. Murray, G. Carvalho, L. Malambo, J. Jung, A. Chang, M. Maeda, S. Popescu, T. Chu, M.J. Starek, M.J. Brewer, G. Richardson, and W.L. Rooney. 2018. Temporal estimates of crop growth in sorghum and maize breeding enabled by unmanned aerial systems. *The Plant Phenome Journal*. 1(1): 1-10.
- Purba, T., R. Situmeang, H.F. Rohman, Mahyati, Arsi, R. Firgiyanto, A.S. Junaedi, T.T. Saadah, Junairiah, J. Herawati, dan A.A. Suhastyo. 2021. *Pupuk dan Teknologi Pemupukan*. Yayasan Kita Menulis. Medan.
- Rahma, D.E., J.P.A. Rinando, M.Z. Malik, N. Afifah, Q. Aini, S. Gunawan, dan S. Utaya. 2023. Pengaruh kondisi lingkungan fisik terhadap perubahan suhu udara di Universitas Negeri Malang. *Jurnal MIPA dan Pembelajarannya*. 3(4): 151-162.
- Rahmadani, D., P.E. Sasongko, dan K. Wijaya. 2023. Prediksi kemampuan tanah dalam menahan air pada berbagai tipe penggunaan lahan di Desa Karangpatihan, Kecamatan Balong, Kabupaten Ponorogo menggunakan karakteristik tanah yang tersedia. *Jurnal Ilmu-Ilmu Pertanian Indonesia*. 25(2): 66-73.
- Ramirez-Jaramillo, G., M.G. Lozano-Contreras, and J.H. Ramirez-Silva. 2020. Agroclimatic conditions for growing *Sorghum bicolor* L. Moench, under irrigation conditions in Mexico. *Open Access Library Journal*. 7: 1-14.

- Reyes-Cabrera, J., C.B. Adams, J. Nielsen, and J.E. Erickson. 2023. Yield, nitrogen, and water-use efficiency of grain sorghum with diverse crown root angle. *Field Crop Research*. 294: 1-10.
- Roozeboom, K.L. and P.V.V. Prasad. 2019. *Sorghum Growth and Development*. American Society of Agronomy, Crop Science Society of America, and Soil Science Society of America. Madison.
- Roba, T.B. 2018. Review on: the effect of mixing organic and inorganic fertilizer on productivity and soil fertility. *Open Access Library Journal*. 5(6): 1-11.
- Ruswanti, D. 2020. Pengukuran performa *support vector machine* dan *neural network* dalam meramalkan tingkat curah hujan. *Gaung Informatika*. 13(1): 66-75.
- Sainju, U.M. 2017. Determination of nitrogen balance in agroecosystems. *Method Article*. 4: 199-208.
- Samanta, S.K. 2025. Soil chemistry in agricultural pollution – pesticide fate, nitrate leaching, and phosphate retention. *International Journal of Innovative Research in Technology*. 12(2): 1773-1779.
- Samijan., E. Nurwahyuni, S. Minarsih, A. Supriyo, S. Jauhari, Y. Hindarwati, M.N. Setiapermas, R.H. Praptana, E. Winarni, and V.E. Aristya. 2024. Optimizing sorghum productivity using balanced fertilizers on dryland. *Phyton*. 93(7): 1403-1420.
- Sari, D.M., K. Lubis, dan Rosmayati. 2017. Penampilan morfofisiologi akar beberapa hasil persilangan (F1) jagung (*Zea mays* L.) pada dua media tanam di rhizotron. *Jurnal Agroekoteknologi FP USU*. 5(3): 665-675.
- Sari, M. dan Nursayuti. 2024. Pemberian pupuk kandang sapi dan pupuk NPK terhadap pertumbuhan dan hasil tanaman sorgum (*Sorghum bicolor* L.). *Pro-Stek*. 6(2): 117-130.
- Schober, P., C. Boer, and L.A. Schwarte. 2018. Correlation coefficients: appropriate use and interpretation. *Anesthesia & Analgesia*. 126(5): 1763-1768.
- Schwenke, G.D. and B.M. Haigh. 2016. The interaction of seasonal rainfall and nitrogen fertiliser rate on soil N₂O emission, total N loss and crop yield of dryland sorghum and sunflower grown on sub-tropical Vertosols. *Soil Research*. 54(5): 604-618.
- Sekaran, U., B.S. Farmaha, M.W. Marshall, and J.O. Payero. 2021. Nitrogen and irrigation management for sorghum in South Carolina. *Land-Grant Press*. 1110: 1-4.
- Shankar, S.R. dan P. Dayanandan. 2020. Structure and histochemistry of sorghum caryopsis in relation to grain-filling. *Notulae Scientia Biologicae*. 12(4): 852-868.

- Shi, H., G. Liu, and Q. Chen. 2024. Research hotspots and trends of nitrification inhibitors: a bibliometric review from 2004–2023. *Sustainability*. 16(10): 1-23.
- Sigua, G.C., K.C. Stone, P.J. Bauer, and A.A. Szogi. 2018. Biomass and nitrogen use efficiency of grain sorghum with nitrogen and supplemental irrigation. *Soil Fertility and Crop Nutrition*. 110(3): 1119-1127.
- Sigua, G.C., K.C. Stone, P.J. Bauer, and A.A. Szogi. 2020. Efficacy of supplemental irrigation and nitrogen management on enhancing nitrogen availability and urease activity in soils with sorghum production. *Sustainability*. 12(20): 1-15.
- Simanungkalit, R.D.M., D.A. Suriadikarta, R. Saraswati, D. Setyorini, dan W. Hartatik. 2006. Pupuk Organik dan Pupuk Hayati. Balai Besar Penelitian dan Pengembangan Sumberdaya Lahan Pertanian. Bogor.
- Sinta, A.G., L. Kolaka, dan Damhuri. 2022. Karakterisasi sorgum (*Sorghum bicolor* L. Moench) aksesori *badong* asal Desa Amonggedo, Kecamatan Amonggedo, Kabupaten Konawe. *Jurnal Alumni Pendidikan Biologi*. 7(3): 99-106.
- Siregar, N., T. Irmansyah, dan Mariati. 2016. Pertumbuhan dan produksi sorgum manis (*Sorghum bicolor* (L.) Moench) terhadap pemberian mulsa dan bahan organik. *Jurnal Agroteknologi*. 4(3): 2188-2195.
- Skorupka, M. and A. Nosalewicz. 2021. Ammonia volatilization from fertilizer urea: a new challenge for agriculture and industry in view of growing global demand for food and energy crops. *Agriculture*. 11(9): 1-15.
- Sriagtula, R., Q. Aini, dan R. Jannah. 2021. Efektivitas pemberian bakteri *Bacillus amyloliquefaciens* sebagai *biofertilizer* terhadap pertumbuhan sorgum mutan *brown midrib* (*Sorghum bicolor* L. Moench) di tanah ultisol. *Jurnal Peternakan Indonesia*. 23(2): 198-207.
- Suarni. 2016. Peranan sifat fisikokimia sorgum dalam diversifikasi pangan dan industri serta prospek pengembangannya. *Jurnal Litbang Pertanian*. 35(3): 99-110.
- Sudarti. dan S.F.D. Putri. 2022. Analisis intensitas cahaya di dalam ruangan dengan menggunakan aplikasi smart lux meter berbasis android. *Jurnal Materi dan Pembelajaran Fisika*. 12(2): 51-55.
- Sulistiyawati, S.H., Pratiwi, dan R.Z. Firdaus. 2023. Pengaruh pemberian nitrogen dan jumlah anakan terhadap pertumbuhan dan produksi tanaman sorgum (*Sorghum bicolor* (L.) Moench) lokal Pasuruan. *Jurnal Ilmu-Ilmu Pertanian*, 7(2): 269-279.
- Sumarno., D.S. Damardjati, M. Syam, dan Hermanto. 2013. Sorgum (Inovasi Teknologi dan Pengembangan). IAARD Press. Jakarta.
- Suminar, R., Suwarto, dan H. Purnamawati. 2017. Pertumbuhan dan hasil sorgum di tanah latosol dengan aplikasi dosis pupuk nitrogen dan fosfor yang berbeda. *Jurnal Agronomi Indonesia*. 45(3): 271-277.

- Suminarti, N.E. 2019. Dampak pemupukan N dan zeolite pada pertumbuhan serta hasil tanaman sorgum (*Sorghum bicolor* L.) var. Super 1. *Jurnal Agro*. 6(1): 1-14.
- Sun, D., S. Wu, X. Li, B. Ge, C. Zhou, X. Yan, R. Ruan, and P. Cheng. 2024. The structure, functions and potential medicinal effects of chlorophylls derived from microalgae. *Marine Drugs*. 22(2): 1-18.
- Suparto, H. 2018. Kehilangan nitrogen pada sistem usahatani jagung manis di lahan gambut Kalimantan Tengah. *Jurnal Agri Peat*. 19(1): 51-58.
- Susilo, E., H. Pujiwati, dan W. Rita. 2023. Dampak tinggi muka air dan bedengan di lahan rawa terhadap pertumbuhan dan hasil sorgum. *Agro Bali: Agricultural Journal*. 6(1): 116-128.
- Swify, S., R. Mazeika, J. Baltrusaitis, D. Drapanauskaite, and K. Barcauskaite. 2024. Review: modified urea fertilizers and their effects on improving nitrogen use efficiency (NUE). *Sustainability*. 16(1): 1-20.
- Tamagno, S., A.J. Eagle, E.L. McLellan, C. van Kessel, B.A. Linquist, J.K. Ladha, M.E. Lundy, and C.M. Pittelkow. 2022. Predicting nitrate leaching loss in temperate rainfed cereal crops: relative importance of management and environmental drivers. *Environmental Research Letters*. 17: 1-12.
- Tariq, A., K.S. Larsen, L.V. Hansen, L.S. Jensen, and S. Bruun. 2022. Effect of nitrification inhibitor (DMPP) on nitrous oxide emissions from agricultural fields: automated and manual measurements. *Science of the Total Environment*. 847: 1-14.
- Tilahun, B. and P.W. Worku. 2022. Response of plant densities and nitrogen rates on sorghum (*Sorghum bicolor* L. Moench) growth and nutrient use efficiency in the central rift valley of Ethiopia. *International Journal of Agriculture and Biosciences*. 11(1): 1-10.
- Toth, A. and Z. Toth. 2025. Nitrogen utilization by grain sorghum as affected by rate of nitrogen fertilization and plant density: a preliminary study. *Advances in Agriculture*. Article ID 5388431: 1-13.
- Uddin, M.S., F. Akter, M.G. Azam, S.A. Bagum, N. Hossain, M. Billah, P.L. Biswas, A.S.M. Hasibuzzaman, A.B.M. Khaldum, A.M. Alsuhaibani, A. Gaber, and A. Hossain. 2023. Evaluation of inbred maize (*Zea mays* L.) for tolerance to low phosphorus at the seedling stage. *Plants*. 12: 1-15.
- United States Department of Agriculture (USDA). 2022. Soil texture calculator. Natural Resources Conservation Service (NRCS) – USDA. <<https://www.nrcs.usda.gov/resources/education-and-teaching-materials/soil-texture-calculator>>. Diakses pada 5 November 2025.
- Venterea, R.T., T.J. Clough, J.A. Coulter, E.F.C. Souza, F. Breuillin-Sessoms, K.A. Spokas, M.J. Sadowsky, S.K. Gupta, and K.F. Bronson. 2021. Temperature alters dicyandiamide (DCD) efficacy for multiple reactive nitrogen species in

urea-amended soils: Experiments and modeling. *Soil Biology and Biochemistry*. 160: 1-11.

- Wang, C., S. Chen, F. Peng, Q. Zhao, J. Gao, L. Zhou, G. Zhang, and M. Shao. 2025. Effects of nitrogen application rate on nitrogen uptake and utilization in waxy sorghum under waxy sorghum–soybean intercropping systems. *Plants*. 14(9): 1-21.
- Wang, X., J. Bai, T. Xie, W. Wang, G. Zhang, S. Yin, and D. Wang. 2021. Effects of biological nitrification inhibitors on nitrogen use efficiency and greenhouse gas emissions in agricultural soils: A review. 220: 1-11.
- Waruwu, I. dan S. Buulolo. 2024. Pengaruh *bulk density* dan total *porosity* terhadap pengelolaan lahan untuk produksi tanaman pangan. *Jurnal Ilmu Pertanian dan Perikanan*. 1(1): 99-104.
- Wiyono dan S.R. Agustinah. 2017. Pengaruh dosis pupuk komposit terhadap pertumbuhan dan hasil sorgum (*Sorghum bicolor* L. Moench) di tanah vertisol. *Jurnal Ilmiah Agrineca*. 17(2): 1-16.
- Yan, P., M. Fang, L. Lu, L. Ren, X. Dong, and Z. Dong. 2022. Effect of urea coated with polyaspartic acid on the yield and nitrogen use efficiency of sorghum (*Sorghum bicolor* (L.) Moench.). *Plant*. 11(13): 1724.
- Yang, M., Y. Fang, D. Sun, and Y. Shi. 2016. Efficiency of two nitrification inhibitors (dicyandiamide and 3,4-dimethylpyrazole phosphate) on soil nitrogen transformations and plant productivity: a meta-analysis. *Scientific Reports*. 6: 1-10.
- Yang, R. and C. Zhong. 2022. Land suitability evaluation of sorghum planting in Luquan County of Jinsha River Dry and Hot Valley based on the perspective of sustainable development of characteristic poverty alleviation industry. *Agriculture*. 12(11): 1-23.
- Yang, X., X. Ma, Z. Ye, L. Yang, J. Shi, X. Wang, B. Zhou, F. Wang, and Z. Deng. 2024. Simulating short-term light responses of photosynthesis and water use efficiency in sweet sorghum under varying temperature and CO₂ conditions. *Frontiers in Plant Science*. 15: 1-15.
- Yang, Y., H. Liu, and J. Lv. 2022. Response of N₂O emission and denitrification genes to different inorganic and organic amendments. *Scientific Reports*. 12: 1-8.
- Yuliani, S., Daniel, dan M. Achmad. 2017. Analisis kandungan nitrogen tanah sawah menggunakan spektrometer. *Jurnal AgriTechno*. 10(2): 188-202.
- Zhang, M., F. Shi, S. Peng, R. Chai, L. Zhang, C. Zhang, and L. Luo. 2024. Trade-off strategy for usage of phosphorus fertilizer in calcareous soil-grown winter wheat: yield, phosphorus use efficiency, and zinc nutrition response. *Agriculture*. 14(3): 1-15.

Zhou, Y., J. Huang, Z. Li, Q. Wang, Y. Li, Y. Zhang, X. Zhang, and Y. Wu. 2024. Optimal nitrogen management for high yield and N use efficiency of ratoon sorghum. *Science Reports*. 14: 1-17.