

DAFTAR PUSTAKA

- Achadian, E. M., Kristini, A., Putra, L. K., & Dianpratiwi, T. 2012. Hama-Hama Pertanaman Tebu di Jawa: Sebaran, Intensitas Serangan dan Keberadaan Musuh Alami Hama. *MPG*, 48(2), 73-83.
- Achadian, E.M. 2022. Materi Bimbingan Teknis Tebu : Hama-Hama Penting Pertanaman Tebu di Indonesia. P3GI. Pasuruan
- Agastya, I., Ameliawati, P., & Fikrinda, W. 2018. Eksplorasi dan identifikasi jamur patogen serangga di rhizosfer lahan kering Kabupaten Malang. *Jurnal PeneLitian Pertanian Terapan*, 17(3), 13-17.
- Ahmed, E., Arshad, M., Khan, M. Z., Amjad, M. S., Sadaf, H. M., Riaz, I. Sidra Sabir & Ahmad, N. 2017. Secondary metabolites and their multidimensional prospective in plant life. *Journal of Pharmacognosy and Phytochemistry*, 6(2), 205-214.
- Aini, N. 2017. Isolasi Jamur Yang Berasosiasi Dengan Serangga di Rizosfer Tanaman Sonokembang (*Pterocarpus indicus* Willd). Fakultas Pertanian Universitas Brawijaya. Skripsi
- Akhsan, N Surya Sila, Sofian, E., A.Syaifudin. 2021. Eksplorasi Dan Karakterisasi Cendawan Entomopatogen Strain *Metarhizium* sp Lokal Di Beberapa Kabupaten Di Kalimantan Timur. *J. Agrifarm* Vol 10 (22-28)
- Alimin, 2022a. Pengendalian Tiga Hama Penting Pada Tebu. <https://ditjenbun.pertanian.go.id/pengendalian-tiga-hama-penting-pada-tebu/>. diakses pada tanggal 15 Juni 2024
- Alimin, 2022b. Strategi Pengendalian Hama Uret Tebu (*L. stigma*). <https://ditjenbun.pertanian.go.id/strategi-pengendalian-hama-uret-tebu-lepidiota-stigma/>. diakses pada tanggal 26 Maret 2024
- Alimin, Edhi Martono, dan Witjaksono. 2014. Penetuan Ale Dan Ae Larva *Lepidiota stigma* F Pada Tanaman Tebu. *Jurnal Teknosains* Vol 3 (2) : 81 - 166
- Amiri, B., Ibrahim, L., & Butt, T. M. 1999. Antifeedant properties of destruxin and their potential use with the entomogenous fungus *Metarhizium anisopliae* for improved control of crucifer pests. *Biocontrol Science and Technology*, 9(4), 487-498.
- Anggraini, S., & Wardati, I. 2024. Uji Efikasi Agens Hayati *Metarhizium* sp. dengan Metode Aplikasi Berbeda terhadap Mortalitas Hama Uret Tanaman Tebu (*Lepidiota stigma* F.). In *Agropross: National Conference Proceedings of Agriculture* (pp. 104-115).
- Arroyo-Manzanares, N., Diana Di Mavungu, J., Garrido-Jurado, I., Arce, L., Vanhaecke, L., Quesada-Moraga, E., & De Saeger, S. 2017. Analytical strategy for determination of known and unknown destruxins using hybrid quadrupole-Orbitrap high-resolution mass spectrometry. *Analytical and bioanalytical chemistry*, 409, 3347-3357.
- Sasmito, D. E. K., Kurniawan, R., & Muhimmah, I. 2014. Karakteristik primer pada polymerase chain reaction (PCR) untuk sekuensing DNA: Mini review. In *Seminar Nasional Informatika Medis (SNIMed)* (pp. 93-102).

- Arsi, Yulia Pujiastuti, Suparman Surya Hadi Kusuma dan Bambang Gunawan. 2020. Eksplorasi, Isolasi Dan Identifikasi Jamur Entomopatogen Yang Menginfeksi Serangga Hama. Jurnal Proteksi Tanaman Tropis Vol 1 (2) : 70-76
- Asia, M.I.M., 2024. Mewujudkan Mimpi Swasembada Gula. news detik.com
- Athifa, S., Anwar, S., & Kristanto, B. A. (2018). Pengaruh keragaman jamur *Metarhizium anisopliae* terhadap mortalitas larva hama *Oryctes rhinoceros* dan *Lepidiota stigma*. *Journal of Agro Complex*, 2(2), 120.
- Aw, K. M. S., & Hue, S. M. 2017. Mode off Infection of *Metarhizium* spp. Fungus and Their Potential as Biological Control Agents. *Journal of Fungi* (Basel, Switzerland), 3(2). <https://doi.org/10.3390/JOF3020030>
- Bedjo, Arifin, M., Rahayu, M. & Sumartini. 2000. Pemanfaatan *Nuclear Polyhedrosis Virus*, *Bacillus thuringiensis* dan *Metarhizium anisopliae* sebagai Biopestisida untuk Pengendalian Hama Kedelai. Laporan Hasil Penelitian The Participatory Development of Agriculture Technology Project (PAATP). Balitkabi. 32 p.
- Bintang, A. S., Wibowo, A., & Harjaka, T. (2015). Keragaman Genetik *Metarhizium anisopliae* Dan Virulensinya Pada Larva Kumbang Badak (*Oryctes Rhinoceros*) Genetic Diversity Of *Metarhizium anisopliae* And Virulence Toward Larvae Of Rhinoceros Beetle (*Oryctes rhinoceros*). *Jurnal Perlindungan Tanaman Indonesia*, 19(1), 12-18.
- BPS. (2020). Statistik Tebu Indonesia 2020
- BPS. 2023. Indonesia Sugarcane Statistics 2022 Vol 13. BPS RI
- Brookes, 2005. Bengkel Ilmu Genetika. Penerbit Erlangga. Indonesia. 82hlm
- Butt, T. M., Hadj, N. B. E., Skrobek, A., Ravensberg, W. J., Wang, C., Lange, C. M., A. Vey, U. Shah & E. Dudley. 2009. Mass spectrometry as a tool for the selective profiling of destruxins; their first identification in *Lecanicillium longisporum*. *Rapid Communications in Mass Spectrometry: An International Journal Devoted to the Rapid Dissemination of Up-to-the-Minute Research in Mass Spectrometry*, 23(10), 1426-1434.
- CABI, 2020, *L. stigma* (Sugarcane White Grub), <https://plantwiseplusknowledgebank.org/doi/full/10.1079/pwkb.species.31422>
- Cai, P., Smith, D., Katz, B., Pearce, C., Venables, D., & Houck, D. (1998). Destruxin-A4 chlorohydrin, a novel destruxin from fungus OS-F68576: isolation, structure determination, and biological activity as an inducer of erythropoietin. *Journal of natural products*, 61(2), 290-293.
- Chandel, R.S., K.S. Verma, Suman Sanjita and Himanshu Thakur. 2023. Distribution, biology and management of white grubs in north-western Himalaya. *Himachal Journal of Agricultural Research* 49(1): 1-17
- Chen, Hong, Murugesan Rangasamy, Sek Yee Tan, Haichuan Wang, Blair D. Siegfrie. 2010. Evaluation of Five Methods for Total DNA Extraction from Western Corn Rootworm Beetles. *PLoS ONE*, 5 (8): e11963
- Cock, M.J.W dan Gillian B. Allard. 2013. Observation on White Grubs Affecting Sugarcane at the Juba Sugar Project, South-Western Somalia, in the 1980, and Implications for heir Management. *Insects* (4):241-272. doi:10.3390/insects4020241

- Darwis, H.S dan Wahyunita. 2015. Isolasi dan Identifikasi beberapa Jamur Entomopatogen Hama Brontispa longissima Gestro (Coleoptera: Chrysomelidae) pada Tanaman Kelapa. Balai Besar Perbenihan dan Proteksi Tanaman Perkebunan (BBPPTP) Medan
- Destéfano, R. H. R., Destéfano, S. A. L., & Messias, C. L. 2004. Detection of *Metarhizium anisopliae* var. *anisopliae* within infected sugarcane borer *Diatraea saccharalis* (Lepidoptera, Pyralidae) using specific primers. *Genetics and MoLecuLar BioLogY*, 27, 245-252.
- Dumas, C., Matha, V., Quiot, J. M., & Vey, A. 1996. Effects of destruxin, cyclic depsipeptide mycotoxins, on calcium balance and phosphorylation of intracellular proteins in lepidopteran cell lines. *Comparative Biochemistry and Physiology Part C: Pharmacology, Toxicology and Endocrinology*, 114(3), 213-219.
- Dwiyanti, Ratih Dewi, Anny Thuraidah dan Nurlailah. 2023. Phytochemical Analysis by LC-HRMS and Antibacterial Activity of the Ethanol Extract of Sengkuang (Dracontomelon dao (Blanco) Merr. & Rofo). *Medical Laboratory Technology Journal* 9(1): 93-100
- Effendy, TA. 2010. Uji toksisitas bioinsektisida jamur *Metarhizium* sp. berbahan pembawa bentuk tepung untuk mengendalikan nilaparvata lugens (Stal.) (Homoptera: Delphacidae). *Jurnal Prosiding Seminar Nasional Unsri*. 20-21.
- Erawati, D.N dan Irma wardati. 2016. Teknologi Pengendali Hayati M. *anisopliae* dan *Beauveria bassiana* Terhadap Hama Kumbang Kelapa Sawit (*Oryctes rhinoceros*). Seminar Nasional Hasil Penelitian dan Pengabdian Masyarakat. Politeknik Negeri Jember
- Ernawati, Dina. 2012. Karakterisasi Fisiologi dan Potensi *Metarhizium* spp. sebagai Agens Pengendali Hayati Penggerek Buah Kakao *Conopomorpha Cramerella* snell. (Lepidoptera: Gracillariidae). [Tesis]. Padang. Sekolah Pasca Sarjana Universitas Andalas
- Espada, A., and M. M. Dreyfuss. 1997. Effect of the cyclopeptolide 90-215 on the production of destruxin and helvolic acid by *Metarhizium anisopliae*. *Journal of Industrial Microbiology & Biotechnolog*.19:7-11.
- FAO. (2018). Sugarcane Crop Publication of the World.
- Freimoser, F. M., Screen, S., Bagga, S., Hu, G., & St Leger, R. J. 2003. Expressed sequence tag (EST) analysis of two subspecies of *Metarhizium anisopliae* reveals a plethora of secreted proteins with potential activity in insect hosts. *Microbiology*, 149(1), 239-247.
- Frendi A, 2017. Efektivitas Kombinasi Agens Penganali Hayaqti (APH) Terhadap Hama Utama Tanaman Tebu Uret (*Lepidiota stigma* F) Di Kecamatan Tamanan Kabupaten Bondowoso. Fakultas Pertanian Universitas Jember. Skripsi
- Gabarty, A., Salem, H. M., Fouda, M. A., Abas, A. A., & Ibrahim, A. A. (2014). Pathogenicity induced by the entomopathogenic fungi *Beauveria bassiana* and *Metarhizium anisopliae* in *Agrotis ipsilon* (Hufn.). *Journal of Radiation Research and Applied Sciences*, 7(1), 95-100.
- Gite, R.B., Mohite, P.B. & Rathour, B. 2015. Distribution and diversity of white grub species in Western Maharashtra, India. *International Journal of Science and Research*, 4 (12), 1270–1272

- Golo, P.S., Gardner, D.R., Grilley, M.M., Takemoto, J.Y., Krasnoff, S.B., Pires, M.S., Fernandes, E.K., Bittencourt, V.R. and Roberts, D.W., 2014. Production of destruxin from *Metarhizium* spp. fungi in artificial medium and in endophytically colonized cowpea plants. *PloS one*, 9(8), p.e104946.
- Gomes E.A., M.C. Kasaya. E.G. deBarros. A.C. Borgs dan E.F. Araujo. 2002. Polymorphism in the internal transcribed spacer (ITS) of the ribosomal DNA of 26 isolates of ectomycorrhizal fungi. *Genet Mol Biol*. 25(4):477- 483
- Gopalakrishnan, C. 2001. Fungal Pathogens as Components in Integrated Pest Management of Horticultural Crops. *Integrated Pest Management in Horticultural Ecosystems*. Capital Publishing Company. New Delhi.122–132
- Grebemariam, A, Yonas Chekol dan Fassil Assefa. 2021. Phenotypic, molecular, and virulence characterization of entomopathogenic fungi, *Beauveria bassiana* (Balsam) Vuillemin, and *Metarhizium anisopliae* (Metschn.) Sorokin from soil samples of Ethiopia for the development of mycoinsecticide. *Heliyon* 7
- Gürlek, S., Sevim, A., Sezgin, F. M., & Sevim, E. 2018. Isolation and characterization of *Beauveria* and *Metarhizium* spp. from walnut fields and their pathogenicity against the codling moth, *Cydia pomonella* (L.) (Lepidoptera: Tortricidae). *Egyptian Journal of Biological Pest Control* 28 1-6.
- Handoyo, D dan Ari. Rudiretna. 2000. Prinsip Umum Dan Pelaksanaan Polymerase Chain Reaction (PCR) [General Principles and Implementation of Polymerase Chain Reaction]. *Unitas*. 9(1):17-29.
- Harahap, M.R. 2018. Elektroforesis: Analisis Elektronika Terhadap Biokimia Genetika. *CIRCUIT: Jurnal Ilmiah Pendidikan Teknik Elektro*, Vol.2, No.1, Februari 2018, hal. 21-26
- Harjaka, T, Edhi Martono, dan Witjaksono. 2010. Uret Perusak Akar Pada Rumput Halaman Kampus. *Jurnal Perlindungan Tanaman Indonesia*. Vol 6 (2): 95-101
- Harjaka, T., Wibowo, A., Wagiman, F. X., & Hidayat, M. W. 2011. Patogenisitas *Metarhizium anisopliae* Terhadap Larva *Lepidota stigma*. In *Prosiding Seminar Nasional IV. Yogyakarta: Jurusan Hama dan Penyakit Tumbuhan, FakuLtas Pertanian UGM*.
- Harrison dan Wingfield. 2015. A taxonomic review of white grubs and leaf chafers (Coleoptera: Scarabaeidae: Melolonthinae) recorded from forestry and agricultural crops in Sub-Saharan Africa. *Bulletin of Entomological Research*: 1-13. doi:10.1017/S0007485315000565
- Haryadi, N.T., Wildan Jadmiko dan Syaifuddin Hasjim. 2013 Integrasi Aplikasi *Metarhizium anisopliae* Dan Nematoda Patogen Serangga Sebagai Agen Pengendali Hayati Hama Uret *Lepidota stigma* Yang Menyerang Tanaman Tebu. <https://repository.unej.ac.id/bitstream/handle/123456789/57796>
- Hasim, P. 2005. Pengaruh Kerapatan Spora Jamur *Beauveria bassiana* Dan *Metarhizium anisopliae* Terhadap Wereng Coklat (*Nilaparvata lugens*). Skripsi. UIN Malang

- Hasyim, A., Setiawati, W., Hudayya, A., & Luthfy, N. 2016. *Sinergisme jamur entomopatogen Metarhizium anisopliae dengan insektisida kimia untuk meningkatkan mortalitas ulat bawang Spodoptera exigua*. Indonesian Agency for Agricultural Research and Development.
- Herlinda S, Octariati N, Suwandi S, Hasbi. 2020. Exploring entomopathogenic fungi from South Sumatra (Indonesia) soil and their pathogenicity against a new invasive maize pest, *Spodoptera frugiperda*. *Biodiversitas Journal of Biological Diversity* 21(7): 2955–2965.
- Hernandez-Trejo A, Estrada-Drouaillet B, Lopez-Santillan JA, Rios-Velasco C, Varela-Fuentes SE, Rodriguez-Herrera R, Osorio-Hernandez E. 2019. In vitro evaluation of native entomopathogenic fungi and neem (*Azadiractha indica*) extracts on *Spodoptera frugiperda*. *International Journal of Experimental Botany*. 88: 47–54.
- Hsiao & Ko. 2001. Determination of destruxin, cyclic peptide toxins, produced by different strains of *Metarhizium anisopliae* and their mutants induced by ethyl methane sulfonate and ultraviolet using HPLC method. *Toxicon* 39 : 837-841
- Hu, Q. B., Ren, S. X., An, X. C., & Qian, M. H. 2007. Insecticidal activity influence of destruxin on the pathogenicity of *Paecilomyces javanicus* against *Spodoptera litura*. *Journal of Applied Entomology*, 131(4), 262-268.
- Hu, Q., Noll, R. J., Li, H., Makarov, A., Hardman, M., & Graham Cooks, R. 2005. The Orbitrap: a new mass spectrometer. *Journal of mass spectrometry*, 40(4), 430-443.
- Hung, S.Y. & D.G. Boucias.1996. Phenoloksidase Activity in Hemolymph of Naïve and *Beauveria bassiana*-Infected *Spodoptera exigua* larvae. Academic Press, inc. Florida
- IISD, & SSI. (2019). Global market report: Sugar. In Exchange Organizational Behavior Teaching Journal.
- Imoulan, A., Wu, H.J., Lu, W.L., Li, Y., Li, B.B., Yang, R.H., Wang, W.J., Wang, X.L., Kirk, P.M., Yao, Y.J. 2016. *Beauveria medogensis* sp nov., a new fungus of the entomopathogenic genus from China. *Journal of Invertebrate Pathology*. 139, 74–81.
- Indrawanto, C. *Purwono, Siswanto, M. syakir, W. Rumini*. 2010. *Budidaya dan Pasca Panen Tebu*. Eska Media. Jakarta
- Indrayani, I.G.A.A dan Aprilia, R. 2020. Evaluasi Patogenisitas Jamur *Metarhizium anisopliae* terhadap Hama Uret Tebu, *Lepidiota stigma* (Coleoptera: Scarabaeidae). *Buletin Plasma Nutfah* 26 (1): 29 -38
- Indrayani, I.G.A.A. 2017. Potensi Jamur *Metarhizium anisopliae* (Metsch.) Sorokin Untuk Pengendalian Secara Hayati Hama Uret Tebu *Lepidiota stigma* (Coleoptera: Scarabaeidae). *Perspektif* Vol 16 (1): 24–32.
- Jati, W. & E.M. Achadian. 2021. Efikasi Beberapa Isolat Jamur *Metarhizium anisopliae* Terhadap Hama Uret *Lepidiota stigma* F. (Coleoptera: Scarabaeidae) di Laboratorium. *Indonesian Sugar Research Journal*. Vol (2): 95-105

- Jegorov, A., Sedmera, P., Havlček, V., & Mat'ha, V. 1998. Destruxin Ed1 a cyclopeptide from the fungus *Metarhizium anisopliae*. *Phytochemistry*, 49(6), 1815-1817.
- Jitendra, M., Kiran, D., Ambika, K., Priya, S., Neha, K., & Sakshi, D. 2012. Biomass production of entomopathogenic fungi using various agro products in Kota region, India. *International Research Journal of Biological Sciences*, 1(4), 12-16.
- Joshi, M dan Deshpande, J.D. 2010. Polymerase Chain Reaction: Methods, Principles and Application. *International Journal of Biomedical Research* 1 (5): 81 - 97.
- Klieber, J., & Reineke, A. 2016. The entomopathogen *Beauveria bassiana* has epiphytic and endophytic activity against the tomato leaf miner *Tuta absoluta*. *Journal of Applied Entomology*, 140(8), 580-589.
- Kumari, T., Sharma, C., Bajpai, V., Kumar, B., Srivastava, M., dan Arya, K.R. 2015. Qualitative Determination of Bioactive Metabolites Through Q-TOF LC/MS in Different Parts and Undifferentiated Cultures of *Ulmus wallichiana* Planchon. *Plant Growth Regulation*. 75:331-340
- Lestari, F. W., & Arumingtyas, E. L. 2013. Phylogenetic identification of pathogenic fungi from apple in Batu City, Malang, Indonesia. *Advances in Microbiology*, 3(1), 69-75.
- Liu, B. L., & Tzeng, Y. M. 2012. Development and applications of destruxin: A review. *Biotechnology advances*, 30(6), 1242-1254.
- Liu, B. L., Chen, J. W., & Tzeng, Y. M. 2000. Production of Cyclodepsipeptides Destruxin A and B from *Metarhizium anisopliae*. *Biotechnology progress*, 16(6), 993-999.
- Magfira, A. A., Himawan, A., & Tarmadja, S. 2022. Aplikasi Jamur *Beauveria bassiana* Dan *Metarhizium anisopliae* Untuk Pengendalian Hama Kumbang Tanduk (*Oryctes rhinoceros*). *AGROISTA: Jurnal Agroteknologi*, 6(1), 61-69.
- Malekan, N., Hatami, B., Ebadi, R., Akhavan, A., & Radjabi, R. 2015. Evaluation of entomopathogenic fungi *Beauveria bassiana* and *Lecanicillium muscarium* on different nymphal stages of greenhouse whitefly *Trialeurodes vaporariorum* in greenhouse conditions. *Biharean biologist*, 9(2), 108-112.
- Moonjely, S., Barelli, L., & Bidochka, M. J. 2016. Insect pathogenic fungi as endophytes. *Advances in genetics*, 94, 107-135.
- Mora, M. A. E., Castilho, A. M. C., & Fraga, M. E. 2017. Classification and infection mechanism of entomopathogenic fungi. *Arquivos do Instituto Biológico*, 84, e0552015.
- Mulyatni, A. S., Priyatmojo, A., & Purwantara, A. (2011). Sekuen Internal Transcribed Spacer (ITS) DNA ribosomal *Oncobasidium theobromae* dan jamur sekerabat pembanding Internal Transcribed Spacer (ITS) sequences of ribosomal DNA *Oncobasidium theobromae* and other related fungi as comparison. *Menara Perkebunan*, 79(1).
- Munsell Soil Color Charts en PDF.<https://www.photoshopplus.fr/munsell-soil-color-charts-en-pdf/>diakses pada 28 April 2025

- Nababan, R., M.C. Tobing, S.F.Sitepu (2022). *Potensi IsoLat Lokal Jamur Entomopatogen Metarhizium sp. dan Beauveria sp. terhadap Larva Spodoptera frugiperda JE Smith (Lepidoptera: Noctuidae)* Jurnal Agroteknologi Vol 10(3), 021-029
- Nirmalasari, C. 2015. Identifikasi Beauveria sp Asal Situ Gede Dengan Analisis Sekuen Internal Transcribed Spacer dan Virulensinya Terhadap *Nilaparvata lugens* Stal. Institut Pertanian Bogor. Skripsi
- Novianti, D. 2017. Efektivitas Beberapa Media untuk Perbanyakkan Jamur *Metarhizium anisopliae*. *Sainmatika: Jurnal Ilmiah Matematika dan Ilmu Pengetahuan Alam*, 14(2), 81-88.
- Nuryanti, N. S. P., Wibowo, L., & Azis, A. 2012. Penambahan beberapa jenis bahan nutrisi pada media perbanyakkan untuk meningkatkan virulensi *Beauveria bassiana* terhadap hama walang sangit. *Jurnal Hama dan Penyakit Tumbuhan Tropika*, 12(1), 64-70.
- Pal, S., Leger, R. J. S., & Wu, L. P. 2007. Fungal peptide Destruxin A plays a specific role in suppressing the innate immune response in *Drosophila melanogaster*. *Journal of Biological Chemistry*, 282(12), 8969-8977.
- Patel, K. 2022. Practical Handbook on Agricultural Microbiology: Isolation and Identification of *Metarhizium*. Humana Press.
- Pontoh, J., & Buyung, N. T. (2011). Analisa asam lemak dalam minyak kelapa murni (VCO) dengan dua peralatan kromatografi gas. *Jurnal Ilmiah Sains*, 274-281.
- Poprawski, T. J., Robert, P. H., & Maniania, N. K. 1994. Contact toxicity of the mycotoxin destruxin E to *Empoasca vitis* (Göthe) (Hom., Cicadellidae). *Journal of Applied Entomology*, 117(1-5), 135-143.
- Prayogo Y., W. Tengkano & Marwoto. 2005. Prospek Cendawan Entomopatogen *Metarhizium anisopliae* untuk Mengendalikan Ulat Grayak *Spodoptera litura* pada Kedelai. Litbang Pertanian. 24(1): 19-26
- Prayogo, Y., & Tengkano, W. (2002). Pengaruh media tumbuh terhadap daya kecambah, sporulasi dan virulensi *Metarhizium anisopliae* (Metchnikoff) Sorokin isolat Kendalpayak pada larva *Spodoptera litura*. *SAINTEKS. Jurnal Ilmiah Ilmu-ilmu Pertanian*.(9), 4, 233-242.
- Pusdatin. 2022. Outlook Komoditas Perkebunan Tebu. Pusdatin Kementerian Pertanian
- Ramakuwela, T., Hatting, J., Bock, C., Vega, F. E., Wells, L., Mbata, G. N., & Shapiro-Ilan, D. 2020. Establishment of *Beauveria bassiana* as a fungal endophyte in pecan (*Carya illinoensis*) seedlings and its virulence against pecan insect pests. *Biological Control*, 140, 104102.
- Ravindran, K., Akutse, K. S., Sivaramakrishnan, S., & Wang, L. (2016). Determination and characterization of destruxin production in *Metarhizium anisopliae* Tk6 and formulations for *Aedes aegypti* mosquitoes control at the field level. *Toxicon*, 120, 89-96.
- Risdiyanti, R. L., Widayati, W., & Suryaminarsih, P. 2022. Exploration and identification of the entomopathogenic fungus *Metarhizium anisopliae* in corn plants in Sebandung Village, Sukorejo, Pasuruan. *Nusantara Science and Technology Proceedings*, 8-13.

- Rustama, Miranti, M., Melanie & Irawan, B. 2008. Patogenisitas Jamur Entomopatogen *Metarhizium anisopliae* terhadap *Crocidolomia pavonana* Fab. dalam kegiatan Studi Pengendalian Hama Terpadu Tanaman Kubis dengan Menggunakan Agensi Hayati. In Laporan Akhir Penelitian Peneliti Muda (Litmud) UNPAD. Bandung: Fakultas MIPA UNPAD
- Sambrook, J., E.F. Fritsch dan T. Manniatis. 1989. Molecular Cloning: A laboratory manual. 2nd ed. Cold Spring Harbour Laboratory Press, New York: xviii.
- Samuels, R. I., Charnley, A. K., & Reynolds, S. E. 1988. The role of destruxin in the pathogenicity of 3 strains of *Metarhizium anisopliae* for the tobacco hornworm *Manduca sexta*. *Mycopathologia*, 104, 51-58.
- Sandhu, S. S., Shukla, H., Aharwal, R. P., Kumar, S., & Shukla, S. (2017). Efficacy of entomopathogenic fungi as green pesticides: current and future prospects. *Microorganisms for green revolution: volume 1: microbes for sustainable crop production*, 327-349.
- Sandhu, S. S., Shukla, H., Aharwal, R. P., Kumar, S., & Shukla, S. 2017. Efficacy of entomopathogenic fungi as green pesticides: current and future prospects. *Microorganisms for green revolution: Volume 1: microbes for sustainable crop production*, 327-349.
- Saputro, A. & Titis, S. 2024. Tingkat Risiko Pendapatan dan Faktor yang Mempengaruhi Pendapatan Usahatani Tebu Keprasan. *Jurnal Sosial Ekonomi Pertanian* Vol 20 (1) : 1 – 10
- Sari, D. E. 2023. Formulasi Cendawan Entomopatogen *Beauveria bassiana* dan *Metarhizium anisopliae* Terhadap *Leptocorisa acuta*: Formulation of Entomopathogenic Fungus *Beauveria bassiana* and *Metarhizium anisopliae* against *Leptocorisa acuta*. *Jurnal Agrotan*, 9(2), 41-44.
- Sembel, D.T. 2012. Dasar-Dasar Perlindungan Tanaman. CV Andi Oddset. Yogyakarta
- Setiawan, B. 2016. Pengaruh Temperatur Terhadap Pertumbuhan Isoat *Metarhizium anisopliae* (Metsch/) Sorokin dan Virulensinya terhadap Ulat Hongkong (*Tenebrio molitor* L). Fakultas Pertanian Universitas Jember. Skripsi
- Sharpe, Nadine. 2005. Recipes for Buffers and Other Laboratory Solutions Used in Electrophoresis, PCR and DNA Extraction. Canada: Department of Biology, Queen's University
- Smoluch, M., G. Grasso, P. Suder, J. Silberring (Eds.). 2019. Mass Spectrometry: An Applied Approach. John Wiley & Sons
- SIM OPT BBPPTP Surabaya. 2023. Rekapitulasi Serangan *Lepidiota stigma* di Wilayah BBPPTP Surabaya. <https://simopt-bbpptp-surabaya.net/>.
- Siswanto, E. 2019. Studi Perilaku Hama Tanaman Tebu *Lepidiota stigma* Fabricius (Coleoptera:Scarabaeidae) Pada Beberapa Perlakuan Pengendalian Dengan Pestisida Nabati Dan Insektisida Imidakloprid. Fakultas Pertanian Universitas Islam Balitar. Skripsi
- Skrobek, A., Shah, F. A., & Butt, T. M. 2008. Destruxin production by the entomogenous fungus *Metarhizium anisopliae* in insects and factors influencing their degradation. *BioControl*, 53, 361-373.

- Soewarno, W., B.A.N. Pinaria, C.L. Salaki, O.R. Pinontoan. 2013. Jamur Yang Berasosiasi Dengan *Plutella Xylostella* L. Pada Sentra Tanaman Kubis Di Kota Tomohon Dan Kecamatan Modinding. Cocos vol 3 No 6. <https://doi.org/10.35791/cocos.v3i6.3002>
- Solichah, C., M.E. Poerwanto, D. Wicaksono. 2022. Jamur *Metarhizium* Sebagai Agen Hayati Pengendali Hama Tanaman. LPPM UPN "Veteran" Yogyakarta
- Sree, K. S., & Padmaja, V. 2008. Oxidative stress induced by destruxin from *Metarhizium anisopliae* (Metch.) involves changes in glutathione and ascorbate metabolism and instigates ultrastructural changes in the salivary glands of *Spodoptera litura* (Fab.) larvae. *Toxicon*, 51(7), 1140-1150.
- Sudiono, J.. 2008. Pemeriksaan Patologi Untuk Diagnosis Neoplasma Mulut. Penerbit Buku Kedokteran EGC. Jakarta
- Suhandono, S., K. Meitha, F.M. Dwivany, P. Septiani, T. Kristianti 2022. Molecular Diagnostic. ITB Press. Bandung
- Suhartawan. 1992. Penyebaran Hama-Hama Tebu Penting di Indonesia Pada Saat Ini. Berita No 6.58 – 64
- Sukma, F.F dan R. Fajri. 2019. Identifikasi Asam Dehidroasetat dalam Produk Kosmetika dengan Menggunakan HPLC (High Performance Liquid Chromatography). *Quimica: Jurnal Kimia Sains dan Terapan* Vol 1 (2): 15-17
- Sun, Y., Hong, S., Chen, H., Yin, Y., & Wang, C. 2022. Production of helvolic acid in *Metarhizium* contributes to fungal infection of insects by bacteriostatic inhibition of the host cuticular microbiomes. *Microbiology Spectrum*, 10(5), e02620-22.
- Sunarto, F.A. & Subiyakto. 2018. Efisiensi Penggunaan Mulsa Plastik dalam Pengendalian Uret (*Lepidiotia stigma* FABRICIUS) pada Tanaman Tebu. Buletin Tanaman Tembakau, Serat & Minyak Industri. Vol. 10(2), Oktober 2018:55–63.
- Sundari, S dan Bambang P. 2019. Teknik Isolasi Dan Elektroforesis DNA Ikan Tapah. Buletin Teknik Litkayasa Akuakultur, 17 (2): 87-90
- Suryanto, D., S. Andriani. dan K. Nurtjahja. 2005. Keragaman Genetik *Ganoderma* spp. dari Beberapa Tempat di Sumatera Utara. J. Ilmiah Pertanian Kultura. 40(2):1-7.
- Surzycki, Stefan. 2003. Human Molecular Biology. United Kingdom: Blackwell Science Publishing Company.
- Sutiharni dkk, 2023. Hama Utama Tanaman Perkebunan. Yayasan Penerbit Muhammad Zaini. Aceh
- Syahnen, D.D.N. Sirait dan S.E.Br. Pinem. 2014. Teknik Uji Mutu Agens Pegendali Hayati (PH) di Laboratorium. Laboratorium Lapangan Balai Besar Perbenihan dan Proteksi Tanaman Perkebunan (BBPPTP) Medan.
- Tanada, Y. and H. K. Kaya, 1993. Insect Pathology. Academic Press, Inc. California
- Tangthirasunun, N., S. Poeaim, K. Soyong, P. Sommartya, & S. Popoonsak. 2010. Variation in Morphology and Ribosomal DNA among Isolates of *Metarhizium anisopliae* from Thailand. *Journal of Agricultural Technology* 2: 317–329

- Thamarai-Chelvi, C., R. Thilagaraj, R. Kandasamy. 2010a. A laboratory and field efficacy of entomopathogenic fungi *Beauveria brongniarti*, *Beauveria bassiana* and *Metarhizium anisopliae* in the control of sugarcane white grub (*Holotrichia serrata*). *Biopestic. Int.* 6(1): 85-88.
- Thamarai-Chelvi, C., W.R. Thilagaraj, and R. Kandasamy. 2010b. Field efficacy of the biopesticide (*Metarhizium anisopliae*) against sugarcane white grubs (*Holotrichia serrata*). *Green Farming* 1: 85-87.
- Thamarai-Chelvi, C., W.R. Thilagaraj, and R. Nalini. 2011. Field efficacy of formulations of microbial insecticide *Metarhizium anisopliae* (Hyphocreales: Clavicipitaceae) for the control of sugarcane white grub *Holotrichia serrata* F. (Coleoptera: Scarabaeidae). *Journal of Biopesticides* 4 (2): 186-189
- Titrawani. 1998. Biodiversiti Kodok Genus Rana Ditinjau dari Morfologi, Kariotip dan Pola Protein di Kodya Sawahlunto. Program Pasca Sarjana. Institut Pertanian Bogor
- Trizelia, T., Santoso, T., Sosromarsono, S., Rauf, A., & Sudirman, L. I. 2013. Keragaman genetik berbagai isolat *Beauveria bassiana* (Bals.) Vuill.(Deuteromycotina: Hyphomycetes) dan virulensinya terhadap *Crociodolomia pavonana*. *Jurnal Natur Indonesia*, 14(3), 176-183.
- Tuldjanah, M., Sasdila, S., Yanuarty, R., Wulandari, A., & Tandi, J. (2024). Determination of Secondary Metabolite Levels in Ethanol Extract of Clove leaves (*Syzygium aromaticum* L.) Using LC-HRMS Methods. *Jurnal Biologi Tropis*, 24(1b), 241-249.
- Ulya, L.N. 2015. Uji Patogenisitas Jamur Entomopatogen *Metarhizium anisopliae* (Moniliales: Moniliaceae) Terhadap Hama Uret *Lepidiotia stigma* F. (Coleoptera: Scarabaeidae). Fakultas Pertanian Universitas Brawijaya. Malang. Skripsi
- Van Meulebroek, L., Bussche, J. V., De Clercq, N., Steppe, K., & Vanhaecke, L. 2015. A metabolomics approach to unravel the regulating role of phytohormones towards carotenoid metabolism in tomato fruit. *MetaboLomics*, 11, 667-683.
- Vey, A., Matha, V., & Dumas, C. 2002. Effects of the peptide mycotoxin destruxin E on insect haemocytes and on dynamics and efficiency of the multicellular immune reaction. *Journal of invertebrate pathoLogy*, 80(3), 177-187.
- Wang, Mingxun. 2025. Mass Spectrometry Terminology. Wang Informatics Lab @UCR edu. https://www.cs.ucr.edu/~mingxunw/terminology/?utm_source=chatgpt.co#ms-data-description. diakses pada tanggal 9 Juli 2025
- Wayne, L. G., Brenner, D. J., Colwell, R. R., Grimont, P. A. D., Kandler, O., Krichevsky, M. I., L.H. Moore, W.E.C Moore, R.G.E Murray, E. Stackebrandt, M.P. Starr, Truper, H. G. 1987. Report of the ad hoc committee on reconciliation of approaches to bacterial systematics. *International journal of systematic and evoLutionary microbioLogy*, 37(4), 463-464.
- White, T.J., T.Bruns, S. Lee, J.W. Taylor. 1990. Amplification and direct sequencing of fungal ribosomal RNA genes for phylogenetics. In: Innis, M.A., Gelfand, D.H., Sninsky, J.J., White, T.J. (Eds.), *PCR Protocols: A Guide to Methods and Applications*. Academic Press. New York. hlm 312–322.

- Widariyanto, R., Pinem, M. I., & Zahara, F. (2017). Patogenitas Beberapa Cendawan Entomopatogen (*Lecanicillium lecanii*, *Metarhizium anisopliae*, dan *Beauveria bassiana*) terhadap *Aphis glycines* pada Tanaman Kedelai: Pathogenicity of Some Entomopathogens Fungus (*Lecanicillium lecanii*, *Metarhizium anisopliae*, and *Beauveria bassiana*) to *Aphis glycines* on Soybean. *JURNAL AGROTEKNOLOGI*, 5(1), 8-16.
- Widiyanti, N.L.P.M dan Sanusi Muryadihardja, 2004. Uji Toksisitas *M. anisopliae* Terhadap Larva Nyamuk *Aedes aegypti*. *Media Litbang Kesehatan* Vol XIV (3); 25-30.
- Wiratmoko, D.A., Agus Supriyanto, Karyadi dan Etik M. Achadian. 2021. Populasi Kumbang *Lepidiota stigma* F. (Coleoptera: Scarabaeidae) Hasil Tangkapan Perangkap Cahaya Pada Musim Penerbangan MT 2019/2020 Di Kebun Mumbul, Jember. *Indonesian Sugar Research Journal* Vol 1 (1) : 59-66
- Yoshimoto, Y., & Imoto, M. (2002). Induction of EGF-dependent apoptosis by vacuolar-type H⁺-ATPase inhibitors in A431 cells overexpressing the EGF receptor. *Experimental Cell Research*, 279(1), 118-127.
- Yuwono, T. 2006. Teori dan Aplikasi Polymerase Chain Reaction. Penerbit Andi. Yogyakarta.
- Zumbo, P. 2013. Ethanol Precipitation. USA: Weill Cornell Medical College