UNIVERSITAS GADJAH MADA
Pengendalian Penyakit Layu Fusarium dan Nematoda Pratylenchus spp. pada Tanaman Pisang dengan Bacillus velezensis B-27 yang dikombinasikan dengan Pupuk Zinc (Zn)
Dhian Noviana Putri, Prof. Dr. Tri Joko, S.P., M.Sc.; Prof. Dr. Ir. Siwi Indarti, M.P.
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

DAFTAR PUSTAKA

Agrios, G.N. 1977. Plant Pathology, 5th ed. Elsevier, Amsterdam.

Alloway, B.J. 2008. Zinc in soils and crop nutrition. International Zinc Association, Brussels.

Aloo, B.N., B.A. Makumba, and E.R. Mbega. 2022. The potential of plant growth-promoting rhizobacteria in enhancing plant growth and health: A review. Microbiological Research, 255: 126942. https://doi.org/10.1016/j.micres.2021.126942

Anjarsari, D.T., E.T. Prasetyawati, dan Y. Wuryandari. 2021. Uji daya hambat *Bacillus* spp. terhadap *Phytophthora palmivora* penyebab penyakit busuk buah kakao. Seminar Nasional Agroteknologi Fakultas Pertanian UPN "Veteran" Jawa Timur, 14-21.

Backer, R., J.S. Rokem, G. Ilangumaran, J. Lamont, D. Praslickova, E. Ricci, S. Subramanian, and D.L. Smith. 2018. Plant growth-promoting rhizobacteria: Context, mechanisms of action, and roadmap to commercialization of biostimulants for sustainable agriculture. Frontiers in Plant Science, 9: 1473. https://doi.org/10.3389/fpls.2018.01473

Badan Pusat Statistik. 2024. Produksi tanaman buah-buahan dan sayuran tahunan menurut provinsi dan jenis tanaman tahun 2024. https://www.bps.go.id/id/statistics-table/3/U0dKc1owczVSalJ5VFdOMWVETnlVRVJ6YlRJMFp6MDkjMw==/produksi-tanaman-buah-buahan-dan-sayuran-tahunan-menurut-provinsi-dan-jenis-tanaman--2024.html?year=2024. <Diakses pada 15 Oktober 2025>

Boisseau, M. and J.L. Sarah. 2008. *In vitro* rearing of Pratylenchidae nematodes on carrot discs. Banana protocol, Fruit, 63(5): 307-310. https://doi.org/10.1051/fruits:2008028

Bridge, J., M. Luc, and R.A. Plowright. 1997. Nematode parasites of bananas and plantains. In: Plant parasitic nematodes in subtropical and tropical agriculture. CAB International, Wallingford.

Bridge, J., S.R. Gowen, and P.R. Speijer. 2005. Nematode parasites of bananas and plantains. In: M. Luc, R.A. Sikora, and J. Bridge (eds.). Plant Parasitic Nematodes in Subtropical and Tropical Agriculture. CABI Publishing, Wallingford, UK. https://doi.org/10.1079/9780851997278.0611

Broadley, M.R., P.J. White, J.P. Hammond, I. Zelko, and A. Lux. 2007. Zinc in plants. New Phytologist, 173(4): 677-702. https://doi.org/10.1111/j.1469-8137.2007.01996.x

Bukhari, B., dan N. Safridar. 2020. Identifikasi tambahan *Trichoderma* pada pisang dari induk terbaik yang telah mendapat perlakuan *Trichoderma* untuk menekan layu Fusarium. Jurnal Agroristek, 3(1): 1-12. https://doi.org/10.47647/jar.v3i1.208

UNIVERSITAS GADJAH MADA
Pengendalian Penyakit Layu Fusarium dan Nematoda Pratylenchus spp. pada Tanaman Pisang dengan Bacillus velezensis B-27 yang dikombinasikan dengan Pupuk Zinc (Zn)
Dhian Noviana Putri, Prof. Dr. Tri Joko, S.P., M.Sc.; Prof. Dr. Ir. Siwi Indarti, M.P.
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Cakmak, I. 2000. Possible roles of zinc in protecting plant cells from damage by reactive oxygen species. New Phytologist, 146(2): 185-205. https://doi.org/10.1046/j.1469-8137.2000.00630.x

Cawoy, H., W. Bettiol, P. Fickers, and M. Ongena. 2011. Bacillus-based biological control of plant diseases. In. Stoycheve M. (ed.). Pesticides in the modern world, pesticides use and management. Intech Europe, Croatia.

Coyne, D.L., Nicol, J.M., and Claudius-Cole, B. 2007. Practical Plant Nematology: A Field and Laboratory Guide. International Institute of Tropical Agriculture (IITA), Cotonou, Benin.

Damodaran, T., V.K. Mishra, S.K. Jha, R. Gopal, S. Rajan, and I. Ahmed. 2020. Biological Management of Banana Fusarium Wilt Caused by *Fusarium oxysporum* f. sp. *cubense* Tropical Race 4 Using Antagonistic Rhizosphere Bacteria. Frontiers in Microbiology, 11, 571037. https://doi.org/10.3389/fmicb.2020.571037

Dita, M.A., L.P. Vicente, and E. Martínez. 2014. Technical Manual Prevention and diagnostic of Fusarium Wilt (Panama disease) of banana caused by *Fusarium oxysporum* f. sp. *cubense* Tropical Race 4 (TR4). Workshop Diagnosis Fusarium Wilt 4: 1-74.

Dita, M., M. Barquero, D. Heck, E.S.G. Mizubuti, and C.P. Staver. 2018. Fusarium wilt of banana: Current knowledge on epidemiology and research needs toward sustainable disease management. Frontiers in Plant Science, 9:1468. https://doi.org/10.3389/fpls.2018.01468

Djohan, A., T. Kuswinanti, Baharudin, and M. Melina. 2020. Wilt disease of banana (*Fusarium oxysporum* f. sp. *cubense*): grouping of isolates in their physiological races. IOP Conference Series: Earth and Environmental Science, 486: 1-7. https://doi.org/10.1088/1755-1315/486/1/012157

Dordas, C. 2008. Role of nutrients in controlling plant diseases in sustainable agriculture. Agronomy for Sustainable Development, 28: 33-46. https://doi.org/10.1051/agro:2007051

Dwidjoseputro, D. 1980. Pengantar Fisiologi Tumbuhan. Gramedia, Jakarta.

Dwivanny, F. M., K. Wikantika, A. Sutanto, M.F. Ghazali, C. Lim dan G. Kamalesha. 2021. Pisang Indonesia. ITB Bandung. Bandung, Indonesia.

Ekayanti, I., S. Widodo, dan A. Santoso. 2023. Budidaya tanaman pisang di Indonesia: Adaptasi terhadap variasi iklim dan tanah. Jurnal Pertanian Tropika, 10(2): 45-56.

Ekayanti, N.L.F., F. Megawati, dan N.L.K.A.A. Dewi. 2023. Artikel Review: Pemanfaatan tanaman pisang (*Musa paradisiaca* L.) sebagai sediaan kosmetik. Jurnal Intregasi Obat Tradisional, 2(2): 19-24.

El-Nagdi, W.M.A., and M.M.A. Youssef. 2004

. Biological control of *Pratylenchus* spp. using plant growth-promoting rhizobacteria. Journal of Pest Science, 77(4): 229-233.

UNIVERSITAS GADJAH MADA
Pengendalian Penyakit Layu Fusarium dan Nematoda Pratylenchus spp. pada Tanaman Pisang dengan Bacillus velezensis B-27 yang dikombinasikan dengan Pupuk Zinc (Zn)
Dhian Noviana Putri, Prof. Dr. Tri Joko, S.P., M.Sc.; Prof. Dr. Ir. Siwi Indarti, M.P.
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Emamverdian, A., Y. Ding, F. Mokhberdoran, and Y. Xie. 2015. Heavy metal stress and some mechanisms of plant defense respone. Journal The Scientific World, 20(15): 87-99. https://doi.org/10.1155/2015/756120

Faradila, N., R. Fevriya, Vauzia, dan I.L.E. Putri. 2023. The effect of nano technology liquid organic fertilizer on growth of red lactus (*Lactuca sativa* L. var. *Crispa*) cultivated hydroponically. Jurnal Biologi Tropis, 23(2): 68-74. https://doi.org/10.29303/jbt.v23i2.4719

Flori, F., Mukarlina dan Rahmawati. 2020. Potensi antagonis isolat bakteri Bacillus spp. asal rhizosfer tanaman lada (*Piper nigrum* L.) sebagai agen pengendali jamur Fusarium sp. JDF. Bioma, 5(1): 111-120. https://doi.org/10.26418/bioma.v5i1.40820

Goers, L., P. Freemont, and K.M. Polizzi. 2014. Co-culture systems and technologies: taking synthetic biology to the next level. J R Soc Interface, 11. https://doi.org/10.1098/rsif.2014.0065

Gowen, S.R., P. Quénéhervé and R. Fogain. 2005. Nematode parasites of bananas and plantains. In: M. Luc, R.A. Sikora and J. Bridge (Eds.). Plant Parasitic Nematodes in Subtropical and Tropical Agriculture. 2nd ed. Wallingford: CAB International. pp. 611–643. https://doi.org/10.1079/9780851997278.0611

Hafeez, B., Y.M. Khanif, and M. Saleem. 2013. Role of zinc in plant nutrition—A review. American Journal of Experimental Agriculture, 3(2): 374-391.

Hashem, A., B. Tabassum, and E.F. Abdullah. 2019. *Bacillus subtilis*: A plant-growth promoting rhizobacterium that also impacts biotic stress tolerance in plants. Saudi Journal of Biological Sciences, 26(6): 1291-1297. https://doi.org/10.1016/j.sjbs.2019.05.004

Hastuti, H., Purnomo, P., Sumardi, I., & Daryono, B. S. 2019. Diversity of wild banana species (*Musa* spp.) in Sulawesi, Indonesia. *Biodiversitas*, 20(3): 824-832. https://doi.org/10.13057/biodiv/d200328

Herrera, R.M., Y. Hernandez, F. Magdama, D. Mostert, S. Bothma, E.M.P Salgado, D. Teran, E. Gonzalez, R. Angulo, L. Angel, Y. Rodr´ıguez, R. Ortega, A. Viljoen, and E.E. Marys. 2023. First report of fusarium wilt of cavendish bananas caused by *Fusarium oxysporum* f. sp. *cubense* Tropical Race 4 in Venezuela. Plant Dis. https://doi.org/10.1094/PDIS-01-23-0186-PDN

Hyakumachi, M., M. Nishimura, T. Arakawa, S. Asano, S. Yoshida, S. Tsushima, and H. Takahashi. 2013. *Bacillus thuringiensis* suppresses bacterial wilt disease caused by *Ralstonia solanacearum* with systemic induction of defense-related gene expression in tomato. Microbes Environ, 28(1): 128-134. https://doi.org/10.1264/jsme2.ME12174

Indarti, S. dan B. Rahayu. 1998. Kajian histopatologi serangan *Pratylenchus* spp. Pada akar pisang kultivar kepok. Jurnal Perlindungan Tanaman Indonesia, 4(2): 92-96. https://doi.org/10.22146/jpti.9905

UNIVERSITAS GADJAH MADA
Pengendalian Penyakit Layu Fusarium dan Nematoda Pratylenchus spp. pada Tanaman Pisang dengan Bacillus velezensis B-27 yang dikombinasikan dengan Pupuk Zinc (Zn)
Dhian Noviana Putri, Prof. Dr. Tri Joko, S.P., M.Sc.; Prof. Dr. Ir. Siwi Indarti, M.P.
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Indarti, S., B. Rahayu, S. Subandiyah, dan L. Indarti. 2011. Pravelensi nematoda parasit pada pertanaman pisang di Daerah Istimewa Yogyakarta. Jurnal Perlindungan Tanaman Indonesia, 17(1): 36-40. https://doi.org/10.22146/jpti.9397

Islam, R., and B. Datta. 2015. *Influence of copper and zinc on siderophore production of Fusarium soil isolates*. Journal of Global Biosciences, 4(4): 1990-1995.

Jayadi, I., I.I. Sanuriza, D.K. Risfianty, K. Ihwan, P. Husain, dan I.R. Dewi. 2025. Analisis patogenisitas *Fusarium solani* dan pengaruhnya terhadap pertumbuhan dan hasil tanaman bawang merah. Biocaster: Jurnal Kajian Biologi, 5(3): 559-568. https://doi.org/10.36312/biocaster.v5i3.512

Jumjunidang, J., C. Hermanto, dan R. Riska. 2011. Virulensi isolat *Fusarium oxysporum* f. sp. *cubense* VCG 01213/16 pada pisang barangan dari varietas pisang dan lokasi yang berbeda. Jurnal Hortikultura, 21(2): 145-151. https://doi.org/10.21082/jhort.v21n2.2011.p145-151

Jones, D.R. (Ed.). 2009. Diseases of Banana, Abaca and Enset (edisi ke-2). CAB International. Wallingford, UK.

Jones, M.G.K., and J. Fosu-Nyarko. 2014. Molecular biology of root lesion nematodes (*Pratylenchus* spp.) and their interaction with host plants. Annals of Applied Biology, 164(2): 163-181. https://doi.org/10.1111/aab.12105

Kristiawati, Y., C. Sumardiyono, dan A. Wibowoa. 2014. Uji pengendalian penyakit layu Fusarium pisang (*Fusarium oxysporum* f. sp. *cubense*) dengan asam fosfit dan aluminium-fosetil. Jurnal Perlindungan Tanaman Indonesia, 18(2): 103-110. https://doi.org/10.22146/jpti.12589

Kumar, A., S. Singh, A.K. Gaurav, S. Srivastava and J.P. Verma. 2020. Plant growth-promoting bacteria: biological tools for the mitigation of biotic stress in plants. Frontiers in Microbiology, 11: 599187. https://doi.org/10.3389/fmicb.2020.599187

Liu, E., Y. Zhang, H. Wang, Z. Li, X. Chen, J. Zhao, dan Q. Sun. 2026. Whole genome analysis of *Bacillus velezensis* YNK-FB0059 and its plant growth-promoting effects. Frontiers in Microbiology, 17: 1748090. https://doi.org/10.3389/fmicb.2026.1748090

Luc, M., R.A. Sikora, and J. Bridge. 2005. Plant parasitic nematodes in subtropical and tropical agriculture. CAB International, Wallingford.

Maharani. 2008. Analisis Cabang Usaha Tani Dan Sistem Tataniaga Pisang Tanduk. Skripsi. Fakultas Pertanian Institut Pertanian Bogor, Bogor.

Mak, C., A.A. Mohamed, K.W. Liew, and Y.W. Ho. 2004. *Early Screening Technique for Fusarium Wilt Resistance in Banana Micropropagated Plants*. http://www.fao.org./docrep/007/ae216e00.HTM <Diakses 4 November 2025>

Maryono, T., M.H. Ramadhan, Ivayani, Purnomo, dan C. Ginting. 2024. Uji ketahanan empat varietas padi terhadap *Sarocladium oryzae* penyebab penyakit busuk pelepah. Jurnal Agrotek Tropika, 12(1):107-114. https://doi.org/10.23960/jat.v12i1.7651

UNIVERSITAS GADJAH MADA
Pengendalian Penyakit Layu Fusarium dan Nematoda Pratylenchus spp. pada Tanaman Pisang dengan Bacillus velezensis B-27 yang dikombinasikan dengan Pupuk Zinc (Zn)
Dhian Noviana Putri, Prof. Dr. Tri Joko, S.P., M.Sc.; Prof. Dr. Ir. Siwi Indarti, M.P.
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Mudita, I.W. 2012. Mengenal Morfologi Tanaman Dan Sistem Pemberian Skor Simmonds-Shepperd Untuk Menentukan Berbagai Kultivar Pisang Turunan musa acuminate danmusabalbisiana. http://www.perlintanfapertaundana.weebly.com. <Diakses 4 November 2025>

Nasir, N. dan Jumjunidang. 2003. Karakterisasi ras *Fusarium oxysporum* f. sp. *cubense* dengan metode *Vegetative Compatibility Group* Test dan identifikasi kultivar pisang yang terserang. *Jurnal Hortikultura*, 13(4): 276–284.

Nelson, P.E. 1993. Taxonomy of Fungi in the Genus Fusarium with Emphasis on *Fusarium oxysporum*. Fusarium Wilt of Banana. APS Press. The American. Phytopathological Society, St. Paul, Minnesota.

Novia, P., Afrida, dan V.Y. Fauziah. 2023. Pengaruh pemberian limbah cair tahu pupuk organik cair (POC) terhadap pertumbuhan dan hasil tanaman selada (*Lactuca sativa* L.). Jurnal Research Ilmu Pertanian, 3(1): 60-65.

Nugraheni, I.A., N. Widyaningsih, S.M. Syarifah, dan W.A. Susila. 2022. Uji antagonis Bacillus megaterium terhadap Fusarium oxysporum dan pengaruhnya pada pertumbuhan tanaman cabai rawit. Jurnal Biosense, 5(1): 14-33.

Nzogela, Y.B., S. Landschoot, A.L. Kihupi, D.L. Coyne, and G. Gheysen. 2020. Pathogenicity of the root-lesion nematode, *Pratylenchus zeae*, on rice genotypes under different hydro-ecologies in Tanzania. Nematology, 22(2): 221-233. https://doi.org/10.1163/15685411-bja10020

Olivares, B.O., J.C. Rey, D. Lobo, J.A. Navas-Cortes, J.A. Gomez, and B.B. Landa. 2021. Fusarium wilt of bananas: a review of agro-environmental factors in the Venezuelan production system affecting its development. Agronomy, 11(5): 986. https://doi.org/10.3390/agronomy11050986

Pegg, K.G., L.M. Coates, W.T. O'Neill, and W. Turner. 2019. The epidemiology of *Fusarium* wilt of banana. Frontiers in Plant Science. https://doi.org/10.3389/fpls.2019.01395

Ploetz, R. C., and K.G. Pegg. 1997. Fusarium wilt of banana and Wallace's line: Was the disease originally restricted to his Indo-Malayan region? Australas. Plant Pathol. 26: 239-249. https://doi.org/10.1071/AP97039

Ploetz, R.C., and K.G. Pegg. 2000. Diseases of Banana Abacá and Enset. CABI Publishing, Wallingford, UK.

Ploetz, R.C. 2015. Fusarium wilt of banana. Phytopathology, 105(12): 1512-1521. https://doi.org/10.1094/PHYTO-04-15-0101-RVW

Pungki, H. 2018. Karakterisasi Morfologi dan Analisis Kimia Buah pada Tanaman Pisang (*Musa* spp.) di Kecamatan Singingi Kabupaten Kuantan Singingi. Skripsi. Universitas Islam Negeri Sultan Syarif Kasim Riau, Riau.

Purwati, R.D. and N. Hidayah. 2008. Inoculation methods and conidial densities of *Fusarium oxysporum* f. sp. *cubense* in Abaca. Hayati Journal of Biosciences, 15(1): 1-7. https://doi.org/10.4308/hjb.15.1.1

UNIVERSITAS
GADJAH MADA
**Pengendalian Penyakit Layu Fusarium dan Nematoda Pratylenchus spp. pada Tanaman Pisang dengan
Bacillus velezensis B-27 yang dikombinasikan dengan Pupuk Zinc (Zn)**
Dhian Noviana Putri, Prof. Dr. Tri Joko, S.P., M.Sc.; Prof. Dr. Ir. Siwi Indarti, M.P.
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Puspita, F., M. Ali, dan R. Pratama. 2017. Isolasi dan karakterisasi morfologi dan fisiologi bakteri *Bacillus* sp. Endofitik dari tanaman kelapa Sawit (*Elaeis guineensis* Jacq.). Jurnal Agroteknologi Tropika, 6(2): 44-49.

Puspita, F., S.H.P. Hadiwiyono, dan D.I. Roslim. 2017. Morphology, physiology and molecular characteristics of oil palm (*Elaeis guineensis* Jacq.) endophytic *Bacillus* sp. International Journal of Biosciences and Biotechnology, 5(1): 80-91. https://doi.org/10.24843/IJBB.2017.v05.i01.p07

Puspitorini, P., A.D. Serdani, T. Endrawati, A.W. Kunharjanti, R. Purwatiningsih, Istiqomah, D. Megasari, A. Wafa, & S. Khoiri. 2024. Perlindungan tanaman. Penerbit Lakeisha, Jawa Tengah.

Qin, L., F.K. Lin, Y.L. Lv, Z.L. Tai, X. Zhang, H.L. Li, Y. Li, dan K. Wang. 2025. Identification of *Pratylenchus coffeae* as a causal agent of root rot disease in *Sorghum bicolor* in China. BMC Microbiology, 25:41. https://doi.org/10.1186/s12866-025-03759-1

Rabbee, M.F., M.S. Ali, J. Choi, B.S. Hwang, S.C. Jeong and K.H. Baek. 2019. *Bacillus velezensis*: a valuable member of bioactive molecules within plant microbiomes. Molecules, 24(6): 1046. https://doi.org/10.3390/molecules24061046

Rahma, A.A., S. Suryanti, and T. Joko. 2020. Induced disease resistance and promotion of shallot growth by *Bacillus velezensis* B-27. Pakistan Journal of Biological Sciences, 23(9): 1113-1121. https://doi.org/10.3923/pjbs.2020.1113.1121

Ravichandra, N.G. 2014. Horticultural nematology. Springer, India.

Rizkyarti, A. 2010. *Perhitungan Intensitas Penyakit*. Laporan Dasar Proteksi Tanaman. Institut Pertanian Bogor. *Dalam* E-Jurnal Agroteknologi Tropika. http://www.eprints.ung.ac.id/. <Diakses 24 April 2026>

Rocha, A.J., M.S. Ferreira, L.S. Rocha, and F. Haddad. 2020. Interaction between *Fusarium oxysporum* f. sp. *cubense* and *Radopholus similis* can lead to changes in the resistance of banana cultivars to Fusarium wilt. European Journal of Plant Pathology, 156: 337-349. https://doi.org/10.1007/s10658-019-01927-6

Rodrigues, M. G. V., Ruggiero, C., Natale, W., and Pacheco, D. D. 2007. *Nutrição e produção da bananeira 'Prata-anã' adubada com zinco e boro diretamente no rizoma, via muda desbastada*. Revista Brasileira de Fruticultura, 29(3): 645-651. https://doi.org/10.1590/S0100-29452007000300042

Santana-Gomes, S.M., L.G. Dias-Arieira, J.C. Biela, M.R. Roldi, T.R. Silva, and D.B. Rampim. 2013. *Mineral nutrition in the control of nematodes*. African Journal of Agricultural Research 8(21):2413–2420.

Saputra, 2010. Penanaman Rumput Gajah Wilayah Tropis dan Subtropika. Gajah Mada University Press, Yogyakarta.

Seftyana, A.S., P.R. Sukma, S. Nuraeni, I.J. Sari, dan N.Q. Mumtazah. 2025. Diversity of *Fusarium* spp. on various host plants in Indonesia: A systematic review. Biotropika: Journal of Tropical Biology, 13(2): 108-114. https://doi.org/10.21776/ub.biotropika.2025.013.02.08

UNIVERSITAS
GADJAH MADA
**Pengendalian Penyakit Layu Fusarium dan Nematoda Pratylenchus spp. pada Tanaman Pisang dengan
Bacillus velezensis B-27 yang dikombinasikan dengan Pupuk Zinc (Zn)**
Dhian Noviana Putri, Prof. Dr. Tri Joko, S.P., M.Sc.; Prof. Dr. Ir. Siwi Indarti, M.P.
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Shabani, H. 2017. Role of plant parasitic nematodes *(Pratylenchus goodeyi* and *Radopholus similis*) in the spread of Fusarium wilt disease of banana. Nelson Mandela African Institution of Science and Technology, Tanzania.

Sibagariang, A. 2019. Uji potensi bakteri antagonis sebagai agen pengendali hayati penyakit layu Fusarium dan pemacu pertumbuhan tanaman krisan (*Chrysanthemum* sp.). Skripsi. Universitas Sumatera Utara, Medan.

Sopialena, S., 2018. Pengendalian Hayati dengan memberdayakan potensi mikroba. Mulawarman University Press, Samarinda.

Stover, R.H. and N.W. Simmonds. 1987. Bananas. 3rd ed. Longman Scientific & Technical, Essex, England.

Sundararaju, P., and R. Thangavelu. 2022. Interaction studies between *Fusarium oxysporum* f. sp. *cubense* and burrowing nematodes in banana. The Pharma Innovation Journal, 11(3): 12-15.

Surendar, K.K., D.D. Devi, I. Ravi, S. Krishnakumar, S.R. Kumar and K. Velayudham. 2013. Water stress in banana- A Review. Bulletin of Environment, Pharmacology and Life Sciences, 2(6): 01-18.

Tran, T.P.H., S.L. Wang, V.B. Nguyen, D.M. Tran, D.S. Nguyen dan A. Nguyen. D. 2019. Study of novel endophytic bacteria for biocontrol of black pepper root-knot nematodes in the central highlands of Vietnam. Agronomy, 9(11): 714. https://doi.org/10.3390/agronomy9110714

Thompson, J.P. and K.L. Bell. 2021. Impacts of root-lesion nematode (*Pratylenchus thornei*) on plant growth, nutrient uptake and wheat productivity. Agronomy, 11(2): 296. https://doi.org/10.3390/agronomy11020296

Valmayor, R.V., R.C. Ploetz, J.B. Jones, and K.G. Rohrbach. 2002. Banana cultivar names and synonyms. International Network for the Improvement of Banana and Plantain (INIBAP).

Van der Plank, J. E. 1963. Plant Disease: Epidemics and control. Acad Press, New York.

Wahyuningsih, A., S. Fajriani, dan N. Aini. 2016. Komposisi nutrisi dan media tanam terhadap pertumbuhan dan hasil tanaman pakcoy (*Brassica rapa* L.) Sistem Hidroponik. Jurnal Produksi Tanaman, 4(8): 595-601.

Wardhana, V.W., S. Wiyono, S.H. Hidayat, dan Widodo. 2021. Patogenesitas *Fusarium oxysporum* endofit asal gulma dari pertanaman pisang terhadap bibit pisang raja bulu. Jurnal Fitopatologi Indonesia, 17(10): 1-8. https://doi.org/10.14692/jfi.17.1.1-8

Widyantoro, A., Hadiwiyono, and Subagiya. 2020. Short communication: biological control of Fusarium wilt on banana plants using biofertilizers. BIODIVERSITAS, 21(5): 2119-2123. https://doi.org/10.13057/biodiv/d210531

Wulandari, N., M. Irfan, dan R. Saragih. 2019. Isolasi dan karakterisasi *plant growth promoting rhizobacteria* dari rizosfer kebun karet rakyat. Dinamika Pertanian, 35(3): 57-64.

Yang, F., L. Wang, S. Li, F. Yan, W. Liang, and Q. Yang. 2025. Zinc exerts antifungal activity against *Fusarium pseudograminearum* by interfering with ROS

UNIVERSITAS
GADJAH MADA
**Pengendalian Penyakit Layu Fusarium dan Nematoda Pratylenchus spp. pada Tanaman Pisang dengan
Bacillus velezensis B-27 yang dikombinasikan dengan Pupuk Zinc (Zn)**
Dhian Noviana Putri, Prof. Dr. Tri Joko, S.P., M.Sc.; Prof. Dr. Ir. Siwi Indarti, M.P.
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

accumulation regulated by transcription factor FpYap1. Pest Management Science. https://doi.org/10.1002/ps.8725

Yu, Y.T., Liu, H. L., A.G. Zhu, G. Zhang, L.B. Zeng, and S.D. Xue. 2012. A review of root lesion nematode: Identification and plant resistance. Advances in Microbiology, 2(4): 411-416.

Yurifals, V.A., A.A. Fatmawaty, E. Sulistyorini, dan A. Saylendra. 2025. Eksplorasi *Bacillus* sp. asal rhizosfer pisang (*Musa paradisiaca*) sebagai agen hayati pengendali layu Fusarium pisang secara *in-vitro*. Jurnal Agroteksos, 35(1): 39-53. https://doi.org/10.29303/agroteksos.v35i1.1398

Zhong, X., Y. Jin, H. Ren, T. Hong, J. Zheng, W. Fan, J. Hong, Z. Chen, A. Wang, H. Lu, K. Zhong, and G. Huang. 2024. Research progress of *Bacillus velezensis* in plant disease resistance and growth promotion. Frontiers in Industrial Microbiology, 2: 1442980. https://doi.org/10.3389/finhm.2024.1442980

Zulfahmi, N., Nurliana, dan Rosmaina. 2024. Klasifikasi genom dan hubungan kekerabatan tanaman pisang (*Musa* spp.) di Kabupaten Rokan Hulu berdasarkan karakter morfologi. Agrosains: Jurnal Penelitian Agronomi, 26(1): 25-30. https://doi.org/10.20961/agsjpa.v26i1.78744