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DAFTAR PUSTAKA

Akhtar, A., Asghar, W. & Khalid, N. 2021. Phytochemical constituents and biological properties of domesticated *Capsicum* species: a review. *Bioactive Compounds in Health and Disease-Online ISSN: 2574-0334*, 4(9), 201-225.

Alif, S.M. 2017. *Kiat sukses budidaya cabai rawit*. Bio Genesis.

Anastasya, M.D., Aminudin, A. & Tayubi, Y.R. 2019. Rancang bangun alat monitoring suhu dan kelembaban tanah pada tanaman cabai merah (*Capsicum annuum* L) berbasis android. *In Prosiding Seminar Nasional Fisika*, 1(1), 353-359.

Andrade, N.J.P, Monteros-Altamirano, A., Tapia Bastidas, C.G. & Sørensen, M. 2020. Morphological, sensorial and chemical characterization of chilli peppers (*Capsicum* spp.) from the CATIE genebank. *Agronomy*, 10(11), 1732.

Arsi, A., Octariati, N., Gunawan, B., Herlinda, S., Pujiastuti, Y., Suwandi, S., Irsan, C., Hamidson, H., Efendi, R.A. & Budiarti, L. 2020. Pengaruh teknik budidaya terhadap serangan penyakit pada tanaman cabai rawit (*Capsicum frutescens* L.) di Kecamatan Lempuing, Kabupaten Ogan Komering Ilir. *J-Plantasimbiosa*, 2(2), 41-52.

Asghar, A., Mukhtar, T., Raja, M.U., & Gulzar, A. 2020. Interaction between *Meloidogyne javanica* and *Ralstonia solanacearum* in chili. *Pakistan journal of Zoology*, 52(4), 1525-1530.

Azlay, L., El Boukhari, M.E.M., Mayad, E.H. & Barakate, M. 2023. Biological management of root-knot nematodes (*Meloidogyne* spp.): a review. *Organic Agriculture*, 13(1), 99-117.

Badan Pusat Statistik. 2023. Statistik Indonesia 2023. Jakarta Pusat: Badan Pusat Statistik.

Badan Pusat Statistik. 2025. *Statistik Indonesia 2024*. Jakarta Pusat: Badan Pusat Statistik.

Badan Pangan Nasional. 2024. Direktori perkembangan konsumsi pangan nasional dan provinsi tahun 2019-2023. Jakarta: Badan Pangan Nasional.

Barbary, A., Djian-Caporalino, C., Marteu, N., Fazari, A., Caromel, B., Castagnone-Sereno, P., & Palloix, A. 2016. Plant genetic background increasing the efficiency and durability of major resistance genes to root-knot nematodes can be resolved into a few resistance QTLs. *Front Plant Sci*, 7, 632.

Barboza, G.E., García, C.C., de Bem Bianchetti, L., Romero, M.V. & Scaldaferro, M. 2022. Monograph of wild and cultivated chili peppers (*Capsicum* L., Solanaceae). *PhytoKeys*, 200, 1.

Bloom, A.J., Meyerhoff, P.A., Taylor, A.R. & Rost, T.L. 2002. Root development and absorption of ammonium and nitrate from the rhizosphere. *Journal of Plant Growth Regulation*, 21(4), 416-431.

Cahya, A.A., & Bangun, R.H.B. 2020. Karakteristik Petani dan Kelayakan Usahatani Cabai Besar (*Capsiccum annum* L) dan Cabai Rawit (*Capsiccum frutescens* L) di Sumatera Utara. *Agricore: Jurnal Agribisnis Dan Sosial Ekonomi Pertanian Unpad*, 5(1). 49-58.

UNIVERSITAS
GADJAH MADA
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Carrillo-Fasio, J.A., Angúlo-Castro, A., Martínez-Gallardo, J.Á., Ayala-Tafoya, F., Yáñez-Juárez, M.G. & Retes-Manjarrez, J.E. 2021. Distribution and incidence of root-knot nematodes (*Meloidogyne* spp.) on pepper in Sinaloa, Mexico. *Tropical Plant Pathology*, 46(2), 195-200.

Chahar, S., Singh, N., & Yadav, P. 2021. Effect of root knot nematode (*Meloidogyne incognita*) on the growth of cucumber plant. *Int J Entomol Res*, 6(6), 1-4.

Chusnah, M., & Latif, A. 2021. *Saluran Pemasaran Cabai Rawit di STA Kecamatan Ngoro*. Lembaga Penelitian dan Pengabdian Masyarakat (LPPM).

Dar, A.A., Mahajan, R., & Sharma, S. 2019. Molecular markers for characterization and conservation of plant genetic resources. *Indian Journal of Agricultural Sciences*, 89(11), 1755-1763.

Daryono, B.S., & Tammu, R.M. 2023. *Karakteristik, Potensi Genetik, dan Pemanfaatan Cabai Katokkon Asal Toraja, Indonesia*. UGM PRESS.

De, A.K. 2003. *Capsicum: the genus Capsicum*. CRC Press.

Djian-Caporalino, C., Fazari, A., Arguel, M.J., Vernié, T., VandeCasteele, C., Faure, I., Brunoud, G., Pijarowski, L., Palloix, A., Lefebvre, V., & Abad, P. 2007. Root-knot nematode (*Meloidogyne* spp.) *Me* resistance genes in pepper (*Capsicum annuum* L.) are clustered on the P9 chromosome. *Theoretical and Applied Genetics*, 114, 473-486.

Dominguez-May, A.V., Carrillo-Pech, M., Barredo-Pool, F.A., Martinez-Estevez, M., Us-Camas, R.Y., Moreno-Valenzuela, O.A. & Echevarria-Machado, I., 2013. A novel effect for glycine on root system growth of habanero pepper. *Journal of the American Society for Horticultural Science*, 138(6), 433-442.

Eisenback, J.D. & Triantaphyllou, H.H. 2020. *Root-knot nematodes: Meloidogyne species and races. In Manual of agricultural nematology*. CRC Press.

El-Sappah, A.H., MM, I., H. El-awady, H., Yan, S., Qi, S., Liu, J., Cheng, G.T., & Liang, Y. 2019. Tomato natural resistance genes in controlling the root-knot nematode. *Genes*, 10(11), 925.

Emmanuel-Ikpeme, C., Henry, P., & Okiri, O.A. 2014. Comparative evaluation of the nutritional, phytochemical and microbiological quality of three pepper varieties. *Journal of food and nutrition sciences*, 2(3), 74-80.

Fajriansyah, A., Purnomo, R.H. & Agustina, H. 2012. Pengaruh tinggi muka air tanah pada pertumbuhan tanaman cabai (*Capsicum annum*) dengan irigasi bawah permukaan (subsurface irrigation). *Jurnal Teknik Pertanian Sriwijaya*, 1(1).

Garita, S.A., Bernardo, V.F., Gonzalez, M., Ripodas, J.I., Arango, M.C., & Ruscitti, M. 2021. The false root-knot nematode: Modification of the root anatomy and alteration of the physiological performance in tomato plants. Rhizosphere, 20.

GBIF. 2026. *Capsicum annuum* L. in GBIF Backbone Taxonomy. Checklist dataset https://doi.org/10.15468/39omei accessed via GBIF.org on 2026-04-10.

GBIF. 2026. iNaturalist Research-grade Observations. iNaturalist.org. Occurrence dataset https://doi.org/10.15468/ab3s5x accessed via GBIF.org on 2026-04-16. https://www.gbif.org/occurrence/5892426686

UNIVERSITAS
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GBIF. 2026. iNaturalist Research-grade Observations. iNaturalist.org. Occurrence dataset https://doi.org/10.15468/ab3s5x accessed via GBIF.org on 2026-04-16. https://www.gbif.org/occurrence/5037184837

GBIF. 2026. iNaturalist Research-grade Observations. iNaturalist.org. Occurrence dataset https://doi.org/10.15468/ab3s5x accessed via GBIF.org on 2026-04-16. https://www.gbif.org/occurrence/4976555784

GBIF. 2026. iNaturalist Research-grade Observations. iNaturalist.org. Occurrence dataset https://doi.org/10.15468/ab3s5x accessed via GBIF.org on 2026-04-16. https://www.gbif.org/occurrence/3772968086

GBIF. 2026. iNaturalist Research-grade Observations. iNaturalist.org. Occurrence dataset https://doi.org/10.15468/ab3s5x accessed via GBIF.org on 2026-04-16. https://www.gbif.org/occurrence/5140532648

GBIF. 2026. iNaturalist Research-grade Observations. iNaturalist.org. Occurrence dataset https://doi.org/10.15468/ab3s5x accessed via GBIF.org on 2026-04-16. https://www.gbif.org/occurrence/3455732449

GBIF. 2026. iNaturalist Research-grade Observations. iNaturalist.org. Occurrence dataset https://doi.org/10.15468/ab3s5x accessed via GBIF.org on 2026-04-16. https://www.gbif.org/occurrence/4980466569

GBIF. 2026. *Meloidogyne incognita* (Kofoid & White, 1919) Chitwood, 1949 in GBIF Backbone Taxonomy. Checklist dataset https://doi.org/10.15468/39omei accessed via GBIF.org on 2026-04-10.

Gebhardt, C. 2016. The historical role of species from the Solanaceae plant family in genetic research. *Theoretical and Applied Genetics*, 129(12), 2281-2294.

Ghareeb, R.Y., Belal, E.B., El-Khateeb, N.M., & Shreef, B.A. 2024. Utilizing bio-synthesis of nanomaterials as biological agents for controlling soil-borne diseases in pepper plants: root-knot nematodes and root rot fungus. *BMC Plant Biology*, 24(1), 110.

Gheysen, G., & Mitchum, M.G. 2011. How nematodes manipulate plant development pathways for infection. *Current opinion in plant biology*, 14(4), 415-421.

Gowda, K.H., Reddy, K.M., Maheshwari, U., Prabu, P., Hegde, V. & Arutselvan, R. 2025. Screening, identification of root-knot nematode resistance sources using multivariate analysis and validation of molecular markers linked to Me genes in chilli (*Capsicum annum* L.). *Genetic Resources and Crop Evolution*, 72(3), 2795-2809.

Hwang, S.M., Jang, K.S., Choi, Y.H., & Choi, G.J. 2016. Development of an efficient screening method for resistance of chili pepper plants to *Meloidogyne incognita*. *Horticultural Science and Technology*, 34(2), 282-293.

Irfandri, I., Zulfatri, Z., Hamzah, A., Rustam, R., Fauzana, H., & Effendi, A., 2021. Pengembangan tanaman cabai rawit untuk peningkatan ekonomi keluarga di Desa Koto Parambahan Kecamatan Kampar Kabupaten Kampar. *Journal of Community Services Public Affairs*, 1(2), 45-50.

Jaya, I.B.M.D., Sritamin, M.A.D.E., & Puspawati, N.M. 2014. Uji efektifitas ekstrak daun dari beberapa jenis tanaman untuk mengendalikan nematoda puru akar *Meloidogyne* spp. pada tanaman cabai (*Capsicum annuum* L). *E-Jurnal Agroekoteknologi Tropika*, 3(2), 104-113.

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Jin, L., Jin, N., Wang, S., Meng, X., Xie, Y., Li, Z., Zhang, G., Yin, X., Lyu, J., Zhong, Y., & Yu, J. 2023. Comparing the morphological characteristics and nutritional composition of 23 pepper (*Capsicum annuum* L.) varieties. *European Food Research and Technology*, 249(4), 963-974.

Jindapunnapat, K., Sroisai, P., Auangaree, N., Pornsopin, N., Techawongstien, S., & Tarinta, T. 2025. Spice Defense: Resistance, Capsaicin, and Photosynthesis in Diverse Capsicum Genotypes Under Root-Knot Nematode Stress. *Horticulturae*, 11(6), 607.

Kammerhofer, N., Radakovic, Z., Regis, J.M., Dobrev, P., Vankova, R., Grundler, F.M., Siddique, S., Hofmann, J., & Wieczorek, K. 2015. Role of stress‐related hormones in plant defence during early infection of the cyst nematode *Heterodera schachtii* in Arabidopsis. *New Phytologist*, *207*(3), 778-789.

Khan, A., Khan, A., Ali, A., Fatima, S., & Siddiqui, M.A. 2023. Root-knot nematodes (*Meloidogyne* spp.): biology, plant-nematode interactions and their environmentally benign management strategies. *Gesunde Pflanzen*, 75(6), 2187-2205.

Lagiman, L., & Supriyanta, B. 2021. Estimation of diversity and genetic parameters of ten genoties of large chile (*Capsicum annuum* L). *Journal Techno*, 7(2).

Lelang, M.A., Ceunfin, S., & Lelang, A. 2019. Karakterisasi morfologi dan komponen hasil cabai rawit (*Capsicum frutescens* L.) asal pulau Timor. *Savana cendana*, 4(01), 17-20.

Li, Q., Yang, Y., Liu, F., Li, Y., Yao, H., Peng, D., & Hu, X. 2025. Morphological and molecular characterization and life cycle of *Meloidogyne graminicola* infecting *Allium cepa*. *Agronomy*, 15(8), 1994.

Liu, Y., Liu, Y., Yang, L., Zhang, T., Jin, Y., Liu, L., Du, J., Zhang, D., Li, B., Gao, C. & Liu, F. 2023. The effect of abamectin application in combination with agronomic measures on the control efficacy of cucumber root‐knot nematodes and the cucumber yield. *Pest Management Science*, 79(9), 3190-3199.

Luo, M., Li, B.X., & Wu, H.Y. 2020. Incidence of the rice root-knot nematode, *Meloidogyne graminicola*, in guangxi, China. *The plant pathology journal*, 36(3), 297.

Mao, Z., Zhu, P., Liu, F., Huang, Y., Ling, J., Chen, G., Yang, Y., Feng, D., & Xie, B. 2015. Cloning and functional analyses of pepper CaRKNR involved in *Meloidogyne incognita* resistance. *Euphytica*, 205(3), 903-913.

Marais, M., Swart, A., Fourie, H., Berry, S.D., Knoetze, R. & Malan, A.P. 2017. Techniques and procedures. In Nematology in South Africa: A view from the 21st century. *Cham: Springer International Publishing*. 73-117.

Monselise, S.P. 2018. *Handbook of fruit set and development*. CRC press.

Mudaningrat, A., Umaya, F., Syahriza, F.A.A., Anggraito, Y.U., & Setiati, N. 2023. Literature Review: Aplikasi Penanda Molekuler untuk Analisis Keanekaragaman Genetik Hewan. *BIOPENDIX: Jurnal Biologi, Pendidikan dan Terapan*, 10(1), 11-25.

Narasimhamurthy, H.B., Ravindra, H., Mukesh Sehgal, R.N., & Suresha, D. 2018. Biology and life cycle of rice root-knot nematode (*Meloidogyne graminicola*). *Journal of Entomology and Zoology Studies,* 6(1), 477-479.

UNIVERSITAS
GADJAH MADA
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Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Nickle, W.R. 2020. *Manual of agricultural nematology.* CRC Press.

Olatunji, T.L., & Afolayan, A.J. 2020. Comparative foliar epidermal studies in *Capsicum annuum* L. and *Capsicum frutescens* L. *Journal of Tropical Agriculture*, 58(1).

Pegard, A., Brizzard, G., Fazari, A., Soucaze, O., Abad, P., & Djian-Caporalino, C. 2005. Histological characterization of resistance to different root-knot nematode species related to phenolics accumulation in *Capsicum annuum*. *Phytopathology*, 95(2), 158-165.

Prajapati, A.B., Thumar, R., Singh, T., & Patel, M.Y. 2025. Estimation of avoidable yield loss caused in *Capsicum* due to root-knot nematodes (*Meloidogyne* spp.) in polyhouse. *Int. J. Adv. Biochem. Res*, 9, 9-11.

Putri, R.I., Indarti, S., & Widiastuti, A. 2020. Responses of *Capsicum annuum* varieties toward root knot nematode *Meloidogyne incognita* infection. *Jurnal Perlindungan Tanaman Indonesia*, 24(2), 133-138.

Ramlah, R., Aziz, I.R., Muthiadin, C., Masri, M., Mustami, M.K., & Pabendon, M.B. 2018. Genetic diversity of local maize germplasm of Tana Toraja South Sulawesi using SSR (*simple sequence repeat*) markers. *Ilmu Pertanian (Agricultural Science)*, *2*(3), 144-153.

Saidah, Z., Wulandari, E., & Hapsari, H. 2024. Analisis sikap dan persepsi petani untuk meningkatkan produksi cabai merah melalui penggunaan benih unggul. *Agrikultura*, 35(2), 200-212.

Salazar-Mesta, R.J., Carrillo-Fasio, J.A., Retes-Manjarrez, J.E., García-Estrada, R.S., León-Félix, J., & Tovar-Pedraza, J.M. 2024. Characterization of resistance responses to *Meloidogyne enterolobii* in *Capsicum annuum* landraces from Mexico. *Chilean journal of agricultural research*, 84(3), 301-310.

Santos, M.F.A., Furlanetto, C., Almeida, M.R.A., Carneiro, M.D.G., Mota, F.C., Gomes, A.C.M.M., Silveira, N.O.R., Silva, J.G.P., Castagnone-Sereno, P., Tigano, M.S., & Carneiro, R.M.D.G. 2012. Biometrical, biological, biochemical and molecular characteristics of *Meloidogyne incognita* isolates and related species. *European Journal of Plant Pathology*, 134(4), 671-684.

Sikandar, A., Zhang, M.Y., Wang, Y.Y., Zhu, X.F., Liu, X.Y., Fan, H.Y., Xuan, Y.H., Chen, L.J., & Duan, Y.X. 2020. *Meloidogyne incognita* (root-knot nematode) a risk to agriculture. *Applied Ecology & Environmental Research*, 18(1).

Singarimbun, M.A., Pinem, M.I., & Oemry, S. 2017. Hubungan antara populasi kutu kebul (*Bemisia tabaci* Genn.) dan kejadian penyakit kuning pada tanaman cabai (*Capsicum annum* L.). *Jurnal Agroteknologi*, *5*(4), 847-854.

Shiragaki, K., Yokoi, S., & Tezuka, T. 2020. Phylogenetic analysis and molecular diversity of Capsicum based on rDNA-ITS region. *Horticulturae*, *6*(4), 87.

Veiga Jr, V.F., Wiedemann, L.S.M., Araujo Jr, C.P., & Silva Antonio, A. 2022. *Chemistry and nutritional effects of Capsicum*. Royal Society of Chemistry.

Wahua, C., Okoli, B.E., & Edwin-Wosu, N.L. 2014. Morphological, anatomical, cytological and phytochemical studies on *Capsicum annuum* Linn. (Solanaceae). *European Journal of Experimental Biology*, 4(1), 464-471.

UNIVERSITAS
GADJAH MADA
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Wang, C., Masler, E.P. & Rogers, S.T. 2018. Responses of *Heterodera glycines* and *Meloidogyne incognita* infective juveniles to root tissues, root exudates, and root extracts from three plant species. *Plant Disease*, 102(9), 1733-1740.

Wartono, & Kirana, R. 2020. Morphological characterization of *Phytophthora* from chili and selection of the resistance of six genotypes of cayenne pepper (*Capsicum frutescens*) to root knot disease. *Jurnal Berkala Penelitian Agronomi*, 8(2), 25–32.

Waqas, M., Ahmed, D., & Qamar, M.T. 2022. Surfactant-mediated extraction of capsaicin from *Capsicum annuum* fruit in various solvents. *Heliyon*, *8*(8).

Widiwurjani, D. 2016. *Monograf pemangkasan pada tanaman cabe*. Surabaya (ID): UPN Veteran Jatim.

Widyantara, W. 2016. Risiko produksi cabai merah besar pada berbagai luas garapan usahatani. *E-Jurnal Agribisnis dan Agrowisata*. 5(2), 488- 497.

Wu, X., Zhu, X., Wang, Y., Liu, X., Chen, L., & Duan, Y. 2018. The cold tolerance of the northern root-knot nematode, *Meloidogyne hapla*. *Plos one*, *13*(1)

Zhang, Q., Huang, S., Soladoye, O.P., Zhang, Y, & Fu, Y. 2024. Preparation, pungency, and bioactivity of capsaicin: a review. *International Journal of Food Science and Technology*, 59(9), 6659-6687.