



UNIVERSITAS
GADJAH MADA

Mitigasi Serangan Kumbang Moncong *Rhynchophorus* spp. (Coleoptera: Dryophthoridae) Pada

Perkebunan

Sawit Di Kerincikanan, Siak, Riau

R. Hanindyo Adi Prabowo, Prof. Dr. Suwarno Hadisusanto, S.U.; Sukirno, S.Si., M.Sc., Ph.D.; Dr. Sudaryatno, M.Si.

Universitas Gadjah Mada, 2025 | Diunduh dari <http://etd.repository.ugm.ac.id/>

DAFTAR PUSTAKA

- Abdullah, M. A. R. (2009). Biological control of the red palm weevil, *Rhynchophorus ferrugineus* (Olivier) (Coleoptera: Curculionidae) by the parasitoid mite, *Rhynchopolipus rhynchophori* (Ewing) (Acarina: Podapolipidae). *Journal of the Egyptian Society of Parasitology*, 39(2), 679–686.
- Abraham, V. A., Al-Shuaibi, M., Faleiro, J. R., Abozuhairah, R. A., & Vidyasagar, P. S. P. V. (1998). An integrated approach for the management of red palm weevil *Rhynchophorus ferrugineus* Oliv.: A key pest of date palm in the Middle East. *Sultan Qaboos University Journal for Scientific Research, Agricultural Science*, 3(1), 77–83.
- Abraham, V. A., & Kurian, C. (1973). Chelisoches moris F. (Forficulidae: Dermaptera), a predator on eggs and early instar grubs of the red palm weevil *Rhynchophorus ferrugineus* F. (Curculionidae: Coleoptera). *Journal of Plantation Crops*, 1, 147–152.
- Adi, H., Soesilohadi, R. C. H., Nugroho, A. P., Hadisusanto, S., Sudaryatno, Aldawood, A. S., & Sukirno, S. (2023). Distribution Analysis of Asiatic Palm Weevil *Rhynchophorus vulneratus* Panzer (Coleoptera: Dryphthoridae) using GIS Technique and the Interaction with Coconut Beetle *Oryctes rhinoceros* L. (Coleoptera: Scarabaeidae). *HAYATI Journal of Biosciences*, 30(5), 918–926. <https://doi.org/10.4308/hjb.30.5.918-926>
- Ahmad, M. N., Shariff, A. R. M., Aris, I., & Halin, I. A. (2021). A four stage image processing algorithm for detecting and counting of bagworm, metisa plana walker (Lepidoptera: Psychidae). *Agriculture (Switzerland)*, 11(12). <https://doi.org/10.3390/agriculture11121265>
- Alfazairy, A. A., Hendi, R., El-Minshawy, A. M., & Karam, H. H. (2003). Entomopathogenic agents isolated from 19 coleopteran insect pests in Egypt. *Egyptian Journal of Biological Pest Control*, 13(1/2), 125.
- Astrin, J. J., Stüben, P. E., Misof, B., Wägele, J. W., Gimnich, F., Raupach, M. J.,



UNIVERSITAS
GADJAH MADA

Mitigasi Serangan Kumbang Moncong *Rhynchophorus* spp. (Coleoptera: Dryophthoridae) Pada Perkebunan

Sawit Di Kerincikanan, Siak, Riau

R. Hanindyo Adi Prabowo, Prof. Dr. Suwarno Hadisusanto, S.U.; Sukirno, S.Si., M.Sc., Ph.D.; Dr. Sudaryatno, M.Si.

Universitas Gadjah Mada, 2025 | Diunduh dari <http://etd.repository.ugm.ac.id/>

& Ahrens, D. (2012). Exploring diversity in cryptorhynchine weevils (Coleoptera) using distance-, character- and tree-based species delineation.

Molecular Phylogenetics and Evolution, 63(1), 1–14.

<https://doi.org/10.1016/j.ympev.2011.11.018>

Ávalos, J. A., Balasch, S., & Soto, A. (2016). Flight behaviour and dispersal of *Rhynchophorus ferrugineus* (Coleoptera: Dryophthoridae) adults using mark-release-recapture method. *Bulletin of Entomological Research*, 106(5), 606–614. <https://doi.org/10.1017/S0007485316000341>

Azmi, W. A., Chik, Z., Razak, A. R. A., & Ghani, I. A. G. (2013). A New Invasive Coconut Pest in Malaysia: the Red Palm Weevil (Curculionidae: *Rhynchophorus ferrugineus*). *The Planter*, 89(1043), 97–110.

Azmi, W. A., Daud, S. N., Hussain, M. H., Wai, Y. K., Chik, Z., & Sajap, A. S. (2014). Field trapping of adult red palm weevil *Rhynchophorus ferrugineus* olivier (coleoptera: Curcilionidae) with food baits and synthetic pheromone lure in a coconut plantation. *Philippine Agricultural Scientist*, 97(4), 409–415.

Azmi, W. A., Ju Lian, C., Zakeri, H. A., Yusuf, N., Wan Omar, W. B., Wai, Y. K., Zulkefli, A. N., & Hussain, M. H. (2017). The Red Palm Weevil, *Rhynchophorus ferrugineus*: Current Issues and Challenges in Malaysia. *Oil Palm Bulletin*, 74(August), 17–24.

<http://palmoilis.mpopb.gov.my/publications/OPB/obp74-wahizatul.pdf>

Bedford, G. O. (1980). Biology, Ecology, and Control of Palm Rhinoceros Beetles. *Annual Review of Entomology*, 25(1), 309–339.

<https://doi.org/10.1146/annurev.en.25.010180.001521>

Bedford, G. O. (2014). ADVANCES IN THE CONTROL OF RHINOCEROS BEETLE , *Oryctes rhinoceros* IN OIL PALM. 26(September), 183–194.

Bihal, R., Al-khayri, J. M., Banu, A. N., Kudesia, N., Ahmed, F. K., Sarkar, R., Arora, A., & Abd-elsalam, K. A. (2023). Entomopathogenic Fungi : An Eco-Friendly Synthesis of Sustainable Nanoparticles and Their Nanopesticide Properties. *Microorganisms*, 11(1617), 1–24.

Bouchard, P., Bousquet, Y., Davies, A. E., Alonso-Zarazaga, M. A., Lawrence, J.



UNIVERSITAS
GADJAH MADA

Mitigasi Serangan Kumbang Moncong *Rhynchophorus* spp. (Coleoptera: Dryophthoridae) Pada

Perkebunan

Sawit Di Kerinciakan, Siak, Riau

R. Hanindyo Adi Prabowo, Prof. Dr. Suwarno Hadisusanto, S.U.; Sukirno, S.Si., M.Sc., Ph.D.; Dr. Sudaryatno, M.Si.

Universitas Gadjah Mada, 2025 | Diunduh dari <http://etd.repository.ugm.ac.id/>

- F., Lyal, C. H. C., Newton, A. F., Reid, C. A. M., Schmitt, M., Ślipiński, S. A., & Smith, A. B. T. (2011). Family-group names in Coleoptera (Insecta). *ZooKeys*, 88(SPEC. ISSUE), 1–972. <https://doi.org/10.3897/zookeys.88.807>
- BPS Indonesia. (2020). *Statistik Kelapa Sawit Indonesia Tahun 2020 (Katalog: 5504003)* (dan P. Direktorat Statistik Tanaman Pangan, Hortikultura (ed.); Catalogue:, Vol. 21, Issue 1). BPS–Statistics Indonesia. <https://doi.org/10.1016/j.tmaid.2020.101607%0Ahttps://doi.org/10.1016/j.ijssu.2020.02.034%0Ahttps://onlinelibrary.wiley.com/doi/abs/10.1111/cjag.12228%0Ahttps://doi.org/10.1016/j.ssci.2020.104773%0Ahttps://doi.org/10.1016/j.jinf.2020.04.011%0Ahttps://doi.o>
- BPS Riau. (2020). *Statistik Kelapa Sawit Provinsi Riau*. Badan Pusat Statistik Provinsi Riau.
- Chang, K.-T. (2007). *Introduction to Geographic Information Systems* (4th ed.). McGraw-Hill.
- Chown, S. L., & Nicolson, S. W. (2004). *Insect Physiological Ecology : Mechanism and Patterns*. Oxford Univercity Press Inc.
- Cinnirella, A., Bisci, C., Nardi, S., Ricci, E., Palermo, F. A., & Bracchetti, L. (2020). Analysis of the spread of *Rhynchophorus ferrugineus* in an urban area, using GIS techniques: a study case in Central Italy. *Urban Ecosystems*, 23(2), 255–269. <https://doi.org/10.1007/s11252-019-00920-3>
- Cousin, R., & Ferry, M. (2019). Automatic localization of phoenix by satellite image analysis. *Arab Journal of Plant Protection*, 37(2), 83–88. <https://doi.org/10.22268/AJPP-037.2.083088>
- Ditjenbun. (2021). Statistik Perkebunan Unggulan Nasional 2019-2021. In *Sekretariat Dirjend Perkebunan Kementerian Pertanian*. Direktorat Jendral Perkebunan, Kementerian Pertanian Republik Indoensia.
- Ditjbun. (2023b). *Laporan Kinerja Direktorat Jenderal Perkebunan Tahun 2023*. Direktorat Jendral Perkebunan, Kementerian Pertanian Republik Indoensia.
- Dminić, I., Kozina, A., Bažok, R., & Barčić, J. I. (2010). Geographic Information Systems (GIS) and Entomological Research: a Review. *Journal of Food, Agriculture and Environment*, 8(2), 1193–1198.



UNIVERSITAS
GADJAH MADA

Mitigasi Serangan Kumbang Moncong *Rhynchophorus* spp. (Coleoptera: Dryophthoridae) Pada Perkebunan

Sawit Di Kerincikanan, Siak, Riau

R. Hanindyo Adi Prabowo, Prof. Dr. Suwarno Hadisusanto, S.U.; Sukirno, S.Si., M.Sc., Ph.D.; Dr. Sudaryatno, M.Si.

Universitas Gadjah Mada, 2025 | Diunduh dari <http://etd.repository.ugm.ac.id/>

- El-Mergawy, R., & Al-Ajlan, A. M. (2011). Red palm weevil, *Rhynchophorus ferrugineus* (Olivier): Economic Importance, Biology, Biogeography and Integrated Pest Management. *Journal of Agricultural Science and Technology A, 1(1)*, 1–23. <http://www1.montpellier.inra.fr/ravageurs-du-palmier/images/Rhynchophorus/ElMergawyRhynchpIPMJAST11.pdf>
- El-Sabea, A. M. R., Faleiro, J. R., & Abo-El-saad, M. M. (2009). The threat of red palm weevil *Rhynchophorus ferrugineus* to date plantations of the Gulf region in the Middle-East: An economic perspective. *Outlooks on Pest Management, 20(3)*, 131–134. <https://doi.org/10.1564/20jun11>
- El-Sharabasy, H. M. (2010). A Survey of Mite Species Associated with the Red Palm Weevil, *Rhynchophorus ferrugineus* (Oliver) in Egypt. *Egyptian Journal, 20(1)*, 67–70.
- EPPO. (2020). EPPO Datasheet: *Rhynchophorus ferrugineus*. *EPPO Global Database*.
<https://gd.eppo.int/taxon/BURSXY/datasheet%0Ahttps://gd.eppo.int/taxon/RHYCFE>
- Folmer, O., Black, M., Hoeh, W., Lutz, R., & Vrijenhoek, R. (1994). DNA primers for amplification of mitochondrial cytochrome c oxidase subunit I from diverse metazoan invertebrates. *Molecular Marine Biology and Biotechnology, 3(5)*, 294–299.
- Ge, X., He, S., Wang, T., Yan, W., & Zong, S. (2015). Potential distribution predicted for *Rhynchophorus ferrugineus* in China under different climate warming scenarios. *PLoS ONE, 10(10)*, 1–26.
<https://doi.org/10.1371/journal.pone.0141111>
- Gunawardena, N. (1994). Electroantennogram Response of The Coconut Pest, *Rhynchophorus ferrugineus* (Coleoptera : Curculionidae) To Alcohols. *J.Natn. Sci. Coun., 22(1)*, 25–33.
- Gunawardena, N., & Gunatilake, R. (1993). Preliminary Studies On A Host Attractant Of The Coconut Pest *Rhynchophorus ferrugineus* (Coleoptera : Curculionidae). *J. Natn. Sci. Coun., 21(1)*, 93–101.
- Hadi, B. S. (2019). *Penginderaan Jauh : Pengantar ke Arah Pembelajaran*



Berpikir Spasial. UNY Press.

- Hallett, R. ., Oehlschlager, A. ., & Borden, J. H. (1999). Pheromone trapping protocols for the Asian palm weevil, *Rhynchophorus ferrugineus* (Coleoptera: Curculionidae). *International Journal of Pest Management*, 45(3), 231–237. <https://doi.org/10.1080/096708799227842>
- Hallett, R. H., Crespi, B. J., & Borden, J. H. (2004). Synonymy of *Rhynchophorus ferrugineus* (Olivier), 1790 and *R. vulneratus* (Panzer), 1798 (Coleoptera, Curculionidae, Rhynchophorinae). *Journal of Natural History*, 38(22), 2863–2882. <https://doi.org/10.1080/00222930310001657874>
- Hallett, R. H., Gries, G., Gries, R., Borden, J. H., Czyzewska, E., Oehlschlager, A. C., Pierce, H. D., Angerilli, N. P. D., & Rauf, A. (1993). Aggregation pheromones of two asian palm Weevils, *Rhynchophorus ferrugineus* and *R. vulneratus*. *Naturwissenschaften*, 80(7), 328–331. <https://doi.org/10.1007/BF01141908>
- Hallett, R. H., Perez, A. L., Gries, G., Gries, R., Pierce, H. D., Yue, J., Oehlschlager, A. C., Gonzalez, L. M., & Borden, J. H. (1995). Aggregation pheromone of coconut rhinoceros beetle, *Oryctes rhinoceros* (L.) (coleoptera: Scarabaeidae). *Journal of Chemical Ecology*, 21(10), 1549–1570. <https://doi.org/10.1007/BF02035152>
- Hanjani, S. S., Ardiansyah, M., Nadalia, D., & Sabiham, S. (2015). Dinamika Penggunaan Lahan Dan Perkembangan Perkebunan Kelapa Sawit Di Kabupaten Kubu Raya Dan Sanggau Tahun 1990-2013. *Jurnal Ilmu Tanah Dan Lingkungan*, 17(1), 39. <https://doi.org/10.29244/jitl.17.1.39-45>
- Hara, A. H. (2014). *Coconut Rhinoceros Beetle , Oryctes rhinoceros Topics to Be Covered* (p. 43). College of Tropical Agriculture and Human Resources.
- Hariyadi, P. (2014). *Menngenal Minyak Sawit Dengan Beberapa Karakter Unggulnya* (pp. 1–22). GAPKI.
- Hartono. (2010). Penginderaan Jauh Dan Sistem Informasi Geografi Serta Aplikasinya Di Bidang Pendidikan Dan Pembangunan. *SNPJ-Sig*, 3(1), 12–18. https://publikasiilmiah.ums.ac.id/bitstream/handle/11617/1409/5_Hartono.pdf

f;sequence=1

- Hidayati. (2020). Pengendalian Hama Kelapa Sawit (Elaies Guinessis Jacq) Di Pt. Bumi Palma Lestari, Bagan Jaya Kecamatan Enok Kabupaten Indragiri Hilir – Riau. *Jurnal Agro Indragiri*, 6(2), 42–47.
<https://doi.org/10.32520/jai.v6i2.1468>
- Homa, M., Manikandan, P., Szekeres, A., & Kiss, N. (2019). *Characterization of Aspergillus tamarii Strains From Human Keratomycoses: Molecular Identification, Antifungal Susceptibility Patterns and Cyclopiazonic Acid Producing Abilities*. 10(October), 1–11.
<https://doi.org/10.3389/fmicb.2019.02249>
- Hong, S., Shang, J., Sun, Y., Tang, G., & Wang, C. (2024). Trends in Microbiology Fungal infection of insects : molecular insights and prospects. *Trends in Microbiology*, 32(3), 302–316.
<https://doi.org/10.1016/j.tim.2023.09.005>
- Huang, W., Xie, X., Huo, L., Liang, X., Wang, X., & Chen, X. (2020). An integrative DNA barcoding framework of ladybird beetles (Coleoptera: Coccinellidae). *Scientific Reports*, 10(1), 1–10.
<https://doi.org/10.1038/s41598-020-66874-1>
- Huisman, O., & By, R. A. de. (2009). *Principles of Geographic Information Systems, An Introductory Textbook* (4th ed.). The International Institute for Geo-Information Science and Earth Observation (ITC), Hengelosestraat.
<https://doi.org/10.1016/j.jmva.2014.02.006>
- Husband, R. W., & OConnor, B. M. (1999). Two new ectoparasitic mites (acari: Podapolipidae) of *Rhynchophorus* spp. (Coleoptera: Curculionidae) from Indonesia, Malaysia, the Philippines and West Africa. *International Journal of Acarology*, 25(2), 101–110. <https://doi.org/10.1080/01647959908683621>
- Hussain, A., Elsharabasy, S., Megahed, M., & Abd elmagid, A. (2016). Population Abundance of the Red Palm Weevil *Rhynchophorus ferrugineus* (oliv.) Adults on date Palm Plantations in Baharia Oases Giza Governorate - Egypt. *Journal of Plant Protection and Pathology*, 7(10), 649–654.
<https://doi.org/10.21608/jppp.2016.52097>



UNIVERSITAS
GADJAH MADA

Mitigasi Serangan Kumbang Moncong *Rhynchophorus* spp. (Coleoptera: Dryophthoridae) Pada Perkebunan

Sawit Di Kerincikanan, Siak, Riau

R. Hanindyo Adi Prabowo, Prof. Dr. Suwarno Hadisusanto, S.U.; Sukirno, S.Si., M.Sc., Ph.D.; Dr. Sudaryatno, M.Si.

Universitas Gadjah Mada, 2025 | Diunduh dari <http://etd.repository.ugm.ac.id/>

Hussein, W. B., Hussein, M. A., & Becker, T. (2010). Detection of The Red Palm Weevil *Rhynchophorus ferrugineus* Using its Bioacoustics Features.

Bioacoustics, 19(3), 177–194.

<https://doi.org/10.1080/09524622.2010.9753623>

Idrees, A., Qadir, Z. A., Akutse, K. S., Afzal, A., Hussain, M., Islam, W., Waqas, M. S., Bamisile, B. S., & Li, J. (2021). Effectiveness of Entomopathogenic Fungi on Immature Stages and Feeding Performance of Fall Armyworm ,. *Insect*, 12(1044), 1–16.

Idris, A. B., Mokhtaruddin, H., Zazali, H., Nurul Wahida, O., Yaakop, S., & Hazmi, I. R. (2014). The Potential of Red Palm Weevil Infesting and Destroying Oil Palm Industry in Malaysia. *The Planter*, 90(1058), 329–335.

Indayati, I., & Purwanto, H. (2021). Controlling *Culex Quinquefasciatus* Say, 1823 (Diptera: Culicidae) Using Several *Lysinibacillus Sphaericus* Isolates Endogenic to Indonesia. *Jurnal Biologi Tropis*, 21(1), 298.

<https://doi.org/10.29303/jbt.v21i1.2566>

Indriyanti, D. R., Anggraeni, S. D., & Slamet, M. (2017). Density and composition of *Oryctes rhinoceros* (Coleoptera: Scarabaeidae) stadia in field. *ARPN Journal of Engineering and Applied Sciences*, 12(22), 6364–6371.

Islam, W., Adnan, M., Shabbir, A., Naveed, H., Saddeeq, Y., Qasim, M., Tayyab, M., Noman, A., Shahid, M., Ali, K., & Ali, H. (2021). Microbial Pathogenesis Insect-fungal-interactions : A detailed review on entomopathogenic fungi pathogenicity to combat insect pests. *Microbial Pathogenesis*, 159(March), 105122.

<https://doi.org/10.1016/j.micpath.2021.105122>

Justin, C. G. L., Leelamathi, M., Thangaselvabai, T., & Johnson, S. N. (2008). Bioecology and management of the red palm weevil, *Rhynchophorus ferrugineus* Oliv. (Coleoptera: Curculionidae) on coconut - a review. *Agricultural Reviews*, 29(2), 117–124.

Kaakeh, W. (2005). Longevity, fecundity, and fertility of the red palm weevil, *Rynchophorus ferrugineus* Olivier (Coleoptera: Curculionidae) on natural and artificial diets. *Emirates Journal of Food and Agriculture*, 17(1), 23–33.



<https://doi.org/10.9755/ejfa.v12i1.5045>

Kaakeh, W., El-Ezaby, F., Aboul-Nour, M. M., & Khamis, A. (2001).

Management of The Red Palm Weevil, *Rhynchophorus Ferrugineus* OLIV., by a Pheromone/Food-Based Trapping System. *Proceedings of The Second International Conference on Date Palms*, 325–343.

Kalshoven, L. G. . (1981). *Pests of Crops in Indonesia* (Revised an). P.T. Ichthiar Baru - Van Hoeve.

Kemenperin. (2021). Tantangan dan Prospek Hilirisasi Sawit Nasional Analisis: Pembangunan Industri. In *Kementerian Perindustrian Republik Indonesia*. Kementerian Perindustrian Republik Indonesia.

Khiralla, A., Spina, R., Yagi, S., Mohamed, I., & Laurain-Mattar, D. (2016). Endophytic fungi: Occurrence, classification, function and natural products. In *Endophytic Fungi: Diversity, Characterization and Biocontrol* (Issue December). Nova Science Publisher, Inc.

Kiswanto, Purwanta, J. H., & Wijayanto, B. (2008). *Teknologi Budidaya Kelapa Sawit*. Balai Pengkajian Teknologi Pertanian Lampung.

Kumar, A., Babu, R., Bijulal, S., Abraham, M., Sasidharan, P., Kathuria, S., Sharma, C., Meis, J. F., & Chowdharye, A. (2014). Invasive Mycosis Due to Species of Blastobotrys in Immunocompromised Patients with Reduced Susceptibility to. *Journal of Clinical Microbiology* P., 52(11), 4094–4099.

<https://doi.org/10.1128/JCM.01977-14>

Listia, E., Pradiko, I., Syarovy, M., Hidayat, F., Ginting, E. N., & Farrasati, R. (2019). Pengaruh Ketinggian Tempat terhadap Performa Fisiologis Tanaman Kelapa Sawit (*Elaeis Guineensis* Jacq.) Effects of Altitude on Oil Palm (*Elaeis Guineensis* Jacq.) Physiological Performance. *Jurnal Tanah Dan Iklim*, 43(1), 33–42.

Litwin, A., Nowak, M., & Ro, S. (2020). *Entomopathogenic fungi: unconventional applications*. 1, 23–42. <https://doi.org/10.1007/s11157-020-09525-1>

Löhr, B., Vásquez-Ordóñez, A. A., & Lopez-Lavalle, L. A. B. (2015).

Rhynchophorus palmarum in Disguise: Undescribed Polymorphism in the



UNIVERSITAS
GADJAH MADA

Mitigasi Serangan Kumbang Moncong *Rhynchophorus* spp. (Coleoptera: Dryophthoridae) Pada Perkebunan

Sawit Di Kerincikanan, Siak, Riau

R. Hanindyo Adi Prabowo, Prof. Dr. Suwarno Hadisusanto, S.U.; Sukirno, S.Si., M.Sc., Ph.D.; Dr. Sudaryatno, M.Si.

Universitas Gadjah Mada, 2025 | Diunduh dari <http://etd.repository.ugm.ac.id/>

- “black” Palm Weevil. *PLoS ONE*, 10(12), 1–14.
<https://doi.org/10.1371/journal.pone.0143210>
- Lubis, F. S., Rozen, N., & Efendi, S. (2021). Dinamika Populasi dan Tingkat Kerusakan Ulat Api pada Perkebunan Kelapa Sawit Pasca Replanting. *Prosiding Seminar Nasional Dalam Rangka Dies Natalis Ke-45 UNS Tahun 2021*, 5(1), 1188–1198.
- Ma, Z., Ren, J., & Zhang, R. (2022). Identifying the Genetic Distance Threshold for Entiminae (Coleoptera: Curculionidae) Species Delimitation via COI Barcodes. *Insects*, 13(3). <https://doi.org/10.3390/insects13030261>
- Manjeri, G., Muhamad, R., & Tan, S. G. (2014). Oryctes rhinoceros Beetles, an Oil Palm Pest in Malaysia. *Annual Research & Review in Biology*, 4(22), 3429–3439. <https://doi.org/10.9734/arrb/2014/11023>
- Mankin, R. W. (2011). Recent Developments in The Use of Acoustic Sensors and Signal Processing Tools to Target Early Infestations of Red Palm Weevil in Agricultural Environments. *Florida Entomologist*, 94(4), 761–765.
<https://doi.org/10.1653/024.094.0405>
- Mankin, R. W., Al-Ayedh, H. Y., Aldryhim, Y., & Rohde, B. (2016). Acoustic Detection of *Rhynchophorus ferrugineus* (Coleoptera: Dryophthoridae) and *Oryctes elegans* (Coleoptera: Scarabaeidae) in Phoenix dactylifera (Arecales: Arecaceae) Trees and Offshoots in Saudi Arabian Orchards. *Journal of Economic Entomology*, 109(2), 622–628. <https://doi.org/10.1093/jee/tov398>
- Mankin, R. W., Mizrach, A., Hetzroni, A., Levsky, S., Nakache, Y., & Soroker, V. (2008). Temporal and Spectral features of Sounds of Wood-boring Beetle Larvae: Identifiable Patterns of Activity Enable Improved Discrimination from Background Noise. *Florida Entomologist*, 91(2), 241–248.
[https://doi.org/10.1653/0015-4040\(2008\)91\[241:TASFOS\]2.0.CO;2](https://doi.org/10.1653/0015-4040(2008)91[241:TASFOS]2.0.CO;2)
- Mantzoukas, S., & Eliopoulos, P. A. (2020). applied sciences Endophytic Entomopathogenic Fungi : A Valuable Biological Control Tool against Plant Pests. *Appl. Sci.*, 10(360), 1–13.
- Marzukhi, F., Md Said, M. A., & Ahmad, A. A. (2020). Coconut Tree Stress Detection as an Indicator of Red Palm Weevil (RPW) Attack Using Sentinel



- Data. *International Journal of Built Environment and Sustainability*, 7(3), 1–9. <https://doi.org/10.11113/ijbes.v7.n3.459>
- Massoud, M., Faleiro, J., El-Saad, M., & Sultan, E. (2011). Geographic information system used for assessing the activity of the red palm weevil *Rhynchophorus ferrugineus* (Olivier) in the date palm Oasis of Al-Hassa, Saudi Arabia. *Journal of Plant Protection Research*, 51(3), 234–239. <https://doi.org/10.2478/v10045-011-0039-3>
- Masyitah, I., Sitepu, S. F., & Safni, I. (2017). Potensi Jamur Entomopatogen untuk Mengendalikan Ulat Grayak Spodoptera litura F. pada Tanaman Tembakau In Vivo. *Jurnal Agroekoteknologi*, 5(63), 484–493.
- Mathias Mih, A. (2015). Ecology of Basal Stem Rot Disease of Oil Palm (*Elaeis guineensis*) in Cameroon. *American Journal of Agriculture and Forestry*, 3(5), 208. <https://doi.org/10.11648/j.ajaf.20150305.16>
- Mazza, G., Francardi, V., Simoni, S., Benvenuti, C., Cervo, R., Faleiro, J. R., Llácer, E., Longo, S., Nannelli, R., Tarasco, E., & Roversi, P. F. (2014a). An overview on the natural enemies of *Rhynchophorus* palm weevils, with focus on *R. ferrugineus*. *Biological Control*, 77(October), 83–92. <https://doi.org/10.1016/j.biocontrol.2014.06.010>
- Mazza, G., Francardi, V., Simoni, S., Benvenuti, C., Cervo, R., Faleiro, J. R., Llácer, E., Longo, S., Nannelli, R., Tarasco, E., & Roversi, P. F. (2014b). An overview on the natural enemies of *Rhynchophorus* palm weevils, with focus on *R. ferrugineus*. *Biological Control*, 77, 83–92. <https://doi.org/10.1016/j.biocontrol.2014.06.010>
- Metwally, H. A. A., & Basheer, A. M. (2019). The Behavior and Activity of the Red Palm Weevil *Rhynchophorus ferrugineus* Throughout the Year under Baharia Oasis Conditions , Egypt. *Middle East J. Agric. Res.*, 8(3), 797–807.
- Michie, L. J., Mallard, F., Majerus, M. E. N., & Jiggins, F. M. (2010). Melanic through nature or nurture: Genetic polymorphism and phenotypic plasticity in *Harmonia axyridis*. *Journal of Evolutionary Biology*, 23(8), 1699–1707. <https://doi.org/10.1111/j.1420-9101.2010.02043.x>



UNIVERSITAS
GADJAH MADA

Mitigasi Serangan Kumbang Moncong *Rhynchophorus* spp. (Coleoptera: Dryophthoridae) Pada Perkebunan

Sawit Di Kerincikanan, Siak, Riau

R. Hanindyo Adi Prabowo, Prof. Dr. Suwarno Hadisusanto, S.U.; Sukirno, S.Si., M.Sc., Ph.D.; Dr. Sudaryatno, M.Si.

Universitas Gadjah Mada, 2025 | Diunduh dari <http://etd.repository.ugm.ac.id/>

- Mizzi, S., Dandria, D., Mifsud, D., & Longo, S. (2009). The Red Palm Weevil, *Rhynchophorus ferrugineus* (Olivier, 1790) in Malta. *Bulletin of the Entomological Society of Malta*, 2(September), 111–121.
<https://www.um.edu.mt/library/oar/bitstream/handle/123456789/21010/Mizzi%20et%20al%20-2009.pdf?sequence=1&isAllowed=y>
- Muhsoni, F. F. (2015). *Penginderaan Jauh (Remote Sensing)* (Vol. 59). UTMPRESS.
- Muliani, S., Ridwan, A. dan, & Saputra, H. J. (2017). Tingkat Serangan Beberapa Jenis Hama pada Pertanaman Kelapa Sawit (*Elaeis guineensis* Jacq.) di PT Widya Unggul Lestari, Kabupaten Mamuju. *AgroPlantae*, 6(1), 29–33.
- Murphy, S., & Briscoe, B. (1999). The red palm weevil as an alien invasive: Biology and the prospects for biological control as a component of IPM. *Biocontrol News and Information*, 20(1), 35–46.
- Nguyen, H. C., Lin, K. H., Nguyen, T. P., Le, H. S., Ngo, K. N., Pham, D. C., Tran, T. N., Su, C. H., & Barrow, C. J. (2023). Isolation and Cultivation of *Penicillium citrinum* for Biological Control of *Spodoptera litura* and *Plutella xylostella*. *Fermentation*, 9(5), 1–12.
<https://doi.org/10.3390/fermentation9050438>
- Nicoletti, R., Andolfi, A., Becchimanzi, A., & Salvatore, M. M. (2023). Anti-Insect Properties of *Penicillium* Secondary Metabolites. *Microorganisms*, 11(5), 1–32. <https://doi.org/10.3390/microorganisms11051302>
- Perpetuini, G., Tittarelli, F., Battistelli, N., Suzzi, G., & Tofalo, R. (2020). Contribution of *Pichia manshurica* strains to aroma profile of organic wines. *European Food Research and Technology*, 246(7), 1405–1417.
<https://doi.org/10.1007/s00217-020-03499-8>
- Perrone, G., Susca, A., Cozzi, G., Ehrlich, K., Varga, J., Frisvad, J. C., Meijer, M., Noonim, P., & Mahakarnchanakul, W. (2007). *Biodiversity of Aspergillus species in some important agricultural products*. 53–66.
<https://doi.org/10.3114/sim.2007.59.07>
- Pracaya. (2007). *Hama dan Penyakit Tanaman Edisi Revisi*. Penebar Swadaya.
- Prasetyo, A. E., Priwiratama, H., Rozziansha, T. A. P., Pradana, M. G., &

- Susanto, A. (2019). Status Terkini Hama Kumbang Moncong Pada Perkebunan Kelapa Sawit Di Indonesia. *Warta PPKS*, 24(2), 74–84.
- Prasetyo, A. E., Susanto, A., Utomo, C., & Herawan, T. (2009). Sinergisme Dua Feromon Agregat Dalam Pengendalian *Oryctes rhinoceros* dan *Rhynchophorus* spp. di Perkebunan Kelapa Sawit. *J. Pen. Kelapa Sawit*, 17(1), 23–29.
- Priwiratama, H., Prasetyo, A. E., Pradana, M. G., Rozziansha, T. A. P., Susanto, A., & Chenon, R. D. de. (2019). Weevil Stem Borer and Mesocarp-eating Beetle: New Threat to Oil Palm Plantations in Indonesia. *Proceedings of the PIPOC 2019 International Palm Oil Congress (Agriculture, Biotechnonoly & Sustainability)*, 67–81.
- Qayyum, M. A., Saleem, M. A., Saeed, S., Wakil, W., Ishtiaq, M., Ashraf, W., Ahmed, N., Ali, M., Ikram, R. M., Yasin, M., Maqsood, S., Kiran, S., Qaiser, M. F., Ayaz, R. A., Nawaz, M. Z., Abid, A. D., Khan, K. A., & Alamri, S. A. (2020). Integration of entomopathogenic fungi and eco-friendly insecticides for management of red palm weevil, *Rhynchophorus ferrugineus* (Olivier). *Saudi Journal of Biological Sciences*, 27(7), 1811–1817.
<https://doi.org/10.1016/j.sjbs.2019.12.018>
- Rano, S. H., Afroz, M., & Rahman, M. M. (2022). Application of GIS on Monitoring Agriculture Insect Pests: a Review. *Reviews In Food And Agriculture*, 3(1), 19–23. <https://doi.org/10.26480/rfna.01.2022.19.23>
- Rosmiati, A., Hidayat, C., Firmansyah, E., & Setiati, Y. (2018). Potensi Beauveria bassiana sebagai Agens Hayati Spodoptera litura Fabr. pada Tanaman Kedelai. *Agrikultura*, 29(1), 43.
<https://doi.org/10.24198/agrikultura.v29i1.16925>
- Rozziansha, T. A. P., Hidayat, P., & Harahap, I. S. (2021). Morphological characters of *Rhynchophorus* spp. (Coleoptera:Curculionidae) associated with sago, coconut, and oil palm in Indonesia. *IOP Conference Series: Earth and Environmental Science*, 694(1). <https://doi.org/10.1088/1755-1315/694/1/012051>
- Rugman-Jones, P. F., Hoddle, C. D., Hoddle, M. S., & Stouthamer, R. (2013). The

- Lesser of Two Weevils: Molecular-Genetics of Pest Palm Weevil Populations Confirm *Rhynchophorus vulneratus* (Panzer 1798) as a Valid Species Distinct from *R. ferrugineus* (Olivier 1790), and Reveal the Global Extent of Both. *PLoS ONE*, 8(10), 1–15.
<https://doi.org/10.1371/journal.pone.0078379>
- Salama, H. S., Foda, M. S., El-Bendary, M. A., & Abdel-Razek, A. (2004). Infection of red palm weevil, *Rhynchophorus ferrugineus*, by spore-forming bacilli indigenous to its natural habitat in Egypt. *Journal of Pest Science*, 77(1), 27–31. <https://doi.org/10.1007/s10340-003-0023-4>
- Saunders, C. W., Scheynius, A., & Heitman, J. (2012). Malassezia Fungi Are Specialized to Live on Skin and Associated with Dandruff , Eczema , and Other Skin Diseases. *PLoS Pathogens*, 8(6), 6–9.
<https://doi.org/10.1371/journal.ppat.1002701>
- Sazali, S. N., Hazmi, I. R., Abang, F., Rahim, F., & Jemain, A. A. (2018). Morphometric study of the palm weevils, *Rhynchophorus vulneratus* and *r. ferrugineus* (coleoptera: Curculionidae) in view of insular and mainland populations of Malaysia. *Pertanika Journal of Tropical Agricultural Science*, 41(3), 1329–1340.
- Schoch, C. L., Seifert, K. A., Huhndorf, S., Robert, V., Spouge, J. L., & Levesque, C. A. (2012). Nuclear ribosomal internal transcribed spacer (ITS) region as a universal DNA barcode marker for Fungi. 109(16), 6241–6246. <https://doi.org/10.1073/pnas.1117018109>
- Sharma, L., Bohra, N., Rajput, V. D., Quiroz-Figueroa, F. R., Singh, R. K., & Marques, G. (2021). Advances in entomopathogen isolation: A case of bacteria and fungi. *Microorganisms*, 9(1), 1–25.
<https://doi.org/10.3390/microorganisms9010016>
- Shofiyati, R. (2007). Inderaja untuk Pertanian. *Warta Penelitian Dan Pengembangan Pertanian*, 29(6).
- Sinambela, M., Hasibuan, A., Armus, R. M. R., Marlyono, S. G., Kuswanto, M. M. S., Fatmayanti, A., Manalu, V., Bachtiar, E., Yasa, I. W., Purba, L. I., Chaerul, M., Kato, I., Hidayatulloh, A. N., & Nur, N. K. (2021).



5. Mitigasi dan Manajemen Bencana-1.

- Singh, Z. (2020). Disasters : Implications , Mitigation , and Preparedness. *Indian J Public Health*, 64, 1–3. <https://doi.org/10.4103/ijph.IJPH>
- Soetopo, D., & Indrayani, I. (2007). Status Teknologi dan Prospek Beauveria bassiana Untuk Pengendalian Serangga Hama Tanaman Perkebunan. *Perspektif*, 6(1), 29–46. <https://doi.org/10.21082/p.v6n1.2007>.
- Solanki, M. K., Kashyap, P. L., & Kumari, B. (2020). Phytobiomes: Current Insights and Future Vistas. *Phytobiomes: Current Insights and Future Vistas*, July, 1–403. <https://doi.org/10.1007/978-981-15-3151-4>
- Soroker, V., & Colazza, S. (2016). Handbook of Major Palm Pests: Biology and Management. In *Handbook of Major Palm Pests: Biology and Management* (pp. 1–317). <https://doi.org/10.1002/9781119057468>
- Sujayanand, G. K., Pandey, S., & Rajendran, J. (2019). *Chitinase : A novel biopesticide for insect and nematode pest management ISSN 2394-1227 Issue - 9 September - 2019 Pages - 73. June 2020.*
- Sukirno, S., Lukmawati, D., Serlinegita, S., Hanum, L., Fazari, V., & Siti, A. (2021). *The effectiveness of Samia ricini Drury (Lepidoptera : Saturniidae) and Attacus atlas L . (Lepidoptera : Saturniidae) cocoon extracts as ultraviolet protectants of Bacillus thuringiensis for controlling Spodoptera litura Fab . (Lepidoptera : Noctuida. Tampubolon 2013.* <https://doi.org/10.1007/s42690-021-00540-5>
- Sukirno, S., Tufail, M., Rasool, K. G., & Aldawood, A. S. (2018a). Palm weevil diversity in Indonesia: Description of phenotypic variability in asiatic palm weevil, *Rhynchophorus vulneratus* (Coleoptera: Curculionidae). *Journal of the Entomological Research Society*, 20(3), 1–22.
- Sukirno, S., Tufail, M., Rasool, K. G., & Aldawood, A. S. (2018b). Undescribed Color Polymorphism of the Asiatic Palm Weevil, *Rhynchophorus vulneratus* Panzer (Coleoptera: Curculionidae) in Indonesia: Biodiversity Study Based on COI Gene. *Florida Entomologist*, 101(4), 642. <https://doi.org/10.1653/024.101.0401>
- Suma, P., La Pergola, A., Longo, S., & Soroker, V. (2014). The use of sniffing



- dogs for the detection of *Rhynchophorus ferrugineus*. *Phytoparasitica*, 42(2), 269–274. <https://doi.org/10.1007/s12600-013-0330-0>
- Sumerta, I. N., & Sumarmi, S. (2014). *Kelapa sebagai media kultur lokal pengendali hayati fusan Bacillus thuringiensis var . kurstaki dan Bt var . israelensis*. March 2016. <https://doi.org/10.13140/RG.2.1.4132.2645>
- Suprianto, E., Siregar, H. H., & Purba, A. R. (2015). *Sejarah Kelapa Sawit Di Indoensia*. Pusat Penelitian Kelapa Sawit.
- Susanto, A. (2012). *SOP Pengendalian Ganoderma di Perkebunan Kelapa Sawit*. Pusat Penelitian Kelapa Sawit.
- Susanto, A., & Prasetyo, A. E. (2010). Determination Status and Control to Pests and Diseases on Peatland and Tidal Lowland Oil Palm Plantation in North Sumatra and Borneo. In *International Oil Palm Conference*.
- Susanto, A., Prasetyo, A. E., Priwiratama, H., Roziansha, T. A. P., Simanjuntak, D., Sipayung, A., Purba, R. Y., Sudharto, & Chenon, R. D. de. (2015). *Kunci Sukses Pengendalian Hama dan Penyakit Kelapa Sawit*.
- Susanto, A., Prasetyo, A., E., S., D., R., T. A. P., P., H., Sudharto, P., & Purba, R. Y. (2012). *EWS: Ulat api, ulat kantung, ulat bulu*. Pusat Penelitian Kelapa Sawit.
- Susanto, A., Prasetyo, A. E., Simanjuntak, D., Rozziansha, T. A. P., Priwiratama, H., Sudharto, Chenon, R. D. de, Sipayung, A., P, A. T. W., & Purba, R. Y. (2012). *EWS: Ulat Api, Ulat Kantung, Ulat Bulu*. Pusat Penelitian Kelapa Sawit.
- Susanto, A., Prasetyo, A. E., Sudharto, Priwiratama, H., & Roziansha, T. A. P. (2012). *Pengendalian Terpadu Oryctes rhinoceros di Perkebunan Kelapa Sawit* (Vol. 2). Pusat Penelitian Kelapa Sawit.
- Sutanto, K. D., Husain, M., Rasool, K. G., Al-Qahtani, W. H., & Aldawood, A. S. (2021). Pathogenicity of local and exotic entomopathogenic fungi isolates against different life stages of red palm weevil (*Rhynchophorus ferrugineus*). *PLoS ONE*, 16(7 July), 1–12. <https://doi.org/10.1371/journal.pone.0255029>
- Sutton, T., Dassau, O., & Sutton, M. (2009). *A Gentle Introduction to GIS*. Chief Directorate: Spatial Planning & Information, Department of Land Affairs,

- Eastern Cape. Permission. <https://doi.org/10.2166/wst.1994.0106>
- Tanyi Tambe, J., Riolo, P., Okolle, J. N., Isidoro, N., Fanciulli, P. P., & Dallai, R. (2013). Sexual size differences and colour polymorphism of *Rhynchophorus phoenicis* in the southwest region of Cameroon. *Bulletin of Insectology*, 66(1), 153–159.
- Tiglia, E. A., Vilela, E. F., Moura, J. I. L., & Anjos, N. (1998). Eficiência de armadilhas com feromônio de agregação e cana-de-açúcar na captura de *Rhynchophorus palmarum* (L.). *Anais Da Sociedade Entomológica Do Brasil*, 27(2), 177–183. <https://doi.org/10.1590/s0301-80591998000200002>
- Trisnadi, R. (2014). Kumbang Sagu (*Rhynchophorus* , sp) Penyebab Utama Kematian Pohon Kelapa. <Https://Adoc.Pub/Kumbang-Sagu-Rhynchophorus-Sp-Penyebab-Kematian-Tanaman-Kela.Html> . Accesed on January, 20 2020.
- Turnip, K. N. T., & Fajar, B. Al. (2021). Inventaris Jenis Hama dan Cara Pengendaliannya di Pembibitan Kelapa Sawit (*Elaeis guineensis* Jacq.) PT. Perkebunan Nusantara IV Dolok Sinumbah. *Biologica Samudra*, 3(1), 87–93. <https://doi.org/10.33059/jbs.v3i1.2414>
- Ul Haq, I., Shams, S., Khan, S., Khan, A., & Hameed, A. (2018). A novel report on morphological study of Red Palm Weevil (*Rhynchophorus ferrugineus*) from district Bannu KPK, Pakistan. *Cogent Food & Agriculture*, 4(1), 1–8. <https://doi.org/10.1080/23311932.2018.1425117>
- USDA. (2007). *Indonesia: Palm Oil Production Prospects Continue to Grow*. International Production Assessment DivisionDivision. https://ipad.fas.usda.gov/highlights/2007/12/Indonesia_palmoil/
- USDA. (2022). *Palm Oil Explorer: Import, Export and Production in World*. International Production Assessment DivisionDivision. https://ipad.fas.usda.gov/cropexplorer/cropview/commodityView.aspx?cropid=4243000&sel_year=2022&rankby=Production
- Verma, S. K., & Singh, L. (2002). Novel Universal Primers Establish Identity of an Enormous Number of Animal Species for Forensic Application. *Molecular Ecology Notes*, 3(1), 220–222. <https://doi.org/10.1046/j.1471-8286>

- Wattanapongsiri, A. (1966). a Revision of the Genera *Rhynchophorus* and *Dynamis* (Coleoptera: Curculionidae). *Department of Agriculture Science Bulletin*, 1(1)(June), 418. <https://doi.org/10.10673>
- Wick, R. R., Judd, L. M., & Holt, K. E. (2019). *Performance of neural network basecalling tools for Oxford Nanopore sequencing*. 1–10.
- Wijaya, N. A., Wardati, & Silalahi, D. D. (2018). Identifikasi Defisiensi Nutrisi di Perkebunan Kelapa Sawit PT. SMART Tbk., Menggunakan Penginderaan Jauh. *Jom Ur, Vol. 5*, 1–13.
- Yones, M., Khedery, G., El-Shirbeny, M. A., & Ali, A. M. (2014). Hyperspectral Indices For Assessing Damage By The Red Palm Weevil *Rhynchophorus Ferrugineus* (Coleoptera: Curculionidae) In Date Palms Agrisystems Management in the Desert Environment of Al-Wadi Al-Gadid: Water and Food Security for Sustainable Agriculture. *International Journal of Geosciences and Geomatics*, 2(2), 16–23.
<https://www.researchgate.net/publication/320549235>
- Yulianto, Y., & Ernawati, D. (2015). Serangan *Rhynchophorus ferreinus* Di Wilayah Jawa Timur. *Buletin DITJENBUN Pertanian. BBPPT Surabaya*, 1–7.
- Zhang, H., & Bu, W. (2022). Exploring Large-Scale Patterns of Genetic Variation in the COI Gene among Insecta: Implications for DNA Barcoding and Threshold-Based Species Delimitation Studies. *Insects*, 13(5).
<https://doi.org/10.3390/insects13050425>
- Zhang, Q., Huo, N., Wang, Y., Zhang, Y., Wang, R., & Hou, H. (2017). isolated from Daqu in the brewing of Shanxi Aged Vinegar Aroma-enhancing role of *Pichia manshurica* isolated from Daqu in the brewing of Shanxi Aged Vinegar. *International Journal of Food Properties*, 20(9), 2169–2179.
<https://doi.org/10.1080/10942912.2017.1297823>
- Zin, N. A., & Badaluddin, N. A. (2020). Annals of Agricultural Sciences Biological functions of *Trichoderma* spp . for agriculture applications. *Annals of Agricultural Sciences*, 65(2), 168–178.
<https://doi.org/10.1016/j.aoas.2020.09.003>



Zverev, V., Kozlov, M. V., Forsman, A., & Zvereva, E. L. (2018). Ambient temperatures differently influence colour morphs of the leaf beetle *Chrysomela lapponica*: Roles of thermal melanism and developmental plasticity. *Journal of Thermal Biology*, 74(March), 100–109.
<https://doi.org/10.1016/j.jtherbio.2018.03.019>