



DAFTAR PUSTAKA

- Ahmad, M., S. & S. Pathania. 2017. Ecological Engineering for Pest Management in Agroecosystem-a Review. *International Journal of Current Microbiology Application Science*. 6: 1476-1485.
- Ahmad, M., A. Farid & M. Saeed. 2018. Resistance to New Insecticides and Their Synergism in *Spodoptera exigua* (Lepidoptera: Noctuidae) from Pakistan. *Crop Protection*. 107: 79-86.
- Amaldos G. & N. C. Hsue. 1989. The Biology and the Reproductive Morphology of Beet Army Worm *Spodoptera exigua* (Hübner) (Lepidoptera: Noctuidae). *Chinese Journal of Entomology*. 9: 239-250.
- Amoeabeng, B. W., A. C. Johnson & G. M. Gurr. 2019. Natural Enemy Enhancement and Botanical Insecticide Source: a Review of Dual Use Companion Plants. *Applied Entomology and Zoology*. 54: 1-19.
- Anggara, A. W., D. Buchori & Pudjianto. 2015. Kemapanan Parasitoid *Telenomus remus* (Hymenoptera: Scelionidae) pada Agroekosistem Sederhana dan Kompleks. *Jurnal HPT*. 9: 239-250.
- Arulkumar, G., S. Manisegaran, R. Nalini & M. Mathialagan. 2017. Seasonable Abundance of Beet Armyworm *Spodoptera exigua* (Hübner) Infesting Onion with Weather Factors in Madurai District of Tamil Nadu. *Journal of Entomology and Zoology Studies*. 5: 1157-1162.
- Azidah, A. A. & M. S. Azirun. 2006. Life History of *Spodoptera exigua* (Lepidoptera: Noctuidae) on Various Host Plants. *Bulletin of Entomological Research*. 96: 613-618.
- [BPS] Badan Pusat Statistik. 2018. Rata-rata Konsumsi Per Kapita Seminggu Beberapa Macam Bahan Makanan Penting. <https://www.bps.go.id/statictable/2014/09/08/950/rata-rata-konsumsi-per-kapita-seminggu-beberapa-macam-bahan-makanan-penting-2007-2017.html> [diakses 28 Januari 2019].
- [BPS] Badan Pusat Statistik. 2019a. Produksi Tanaman Sayuran Bawang Merah. <https://www.bps.go.id/site/resultTab> [diakses 11 Januari 2019].
- [BPS] Badan Pusat Statistik. 2019b. Tabel Impor Menurut Komoditi. <https://www.bps.go.id/site/resultTab> [diakses 11 Januari 2019].
- Barnays, E. A. 1998. Evolution of Feeding Behaviour in Insect Herbivores. *BioSciences*. 48: 35-44.
- Basuki, R.S. 2009. Pengetahuan Petani dan Keefektifan Penggunaan Insektisida oleh Petani dalam Pengendalian Ulat *Spodoptera exigua* Hübner pada Tanaman Bawang Merah di Brebes dan Cirebon. *Jurnal Hortikultura*. 19: 459-474.
- Berdegue, M., S. R. Reitz & J. T. Trumble. 1998. Host Plant Selection and Development in *Spodoptera exigua*: Do Mother and Offspring Know Best? *Entomologia Experimentalis et Applicata*. 89: 57-64.
- Bin, Z., L. Huai, H. H. Sanders & W. Jin-jun. 2011. Effect of Host Plants on Development, Fecundity and Enzym Activity of *Spodoptera exigua*



- (Hübner) (Lepidoptera: Noctuidae). *Agricultural Science in China*. 10: 1232-1240.
- CABI. 2019. *Spodoptera exigua* (Beet Armyworm) Datasheet. *Crop Protection Compendium*. <https://www.cabi.org/cpc/datasheet/29808> [diakses 22 Januari 2019].
- Canas, L.A., R.J. O'Neil & T.J. Gibb. 2002. Population Ecology of *Leptinotarsa undecimlineata* Stal. (Coleoptera: Chrysomelidae): Population Dynamics, Mortality Factors, and Potential Natural Enemies for Biological Control of the Colorado Potato Beetle (abstrak). *Biological Control*. 24: 50-64.
- Capinera, J. L. 1999. Beet Armyworm, *Spodoptera exigua* (Hübner) (Insecta: Lepidoptera: Noctuidae). *UF/IFAS Extension*. 4p.
- Cardé, R. T. 1976. Utilization of Pheromones in the Population Management of Moth Pests. *Environmental Health Perspectives*. 14: 133-144.
- Cardé, R. T. 2008. Insect Migration: Do Migrant Moths Know Where They are Heading? *Current Biology*. 18: 472-474.
- Carrasco, D., M. C. Larsson & P. Anderson. 2015. Insect Host Plant Selection in Complex Environment. *Current Opinion in Insect Science*. 8: 1-7.
- Carter, N. 2005. Pest Monitoring: Proper Use of Pheromone Traps. Ministry of Agriculture, Food and Rural Affairs. Ontario. Canada. http://www.omafra.gov.on.ca/english/crops/facts/pheromonetraps_proper.htm. [26 Februari 2016]
- Che, W., T. Shi, Y. Wu & Y. Yang. 2013. Insecticide Resistance Status of Field Populations of *Spodoptera exigua* (Lepidoptera: Noctuidae) from China (abstrak). *Journal of Economic Entomology*. 106: 1855-1862.
- Clissold, F.J., S.J. Simpson. 2015. Temperature, Food Quality and Life History Traits of Herbivorous Insects. *Current Opinion in Insect Science*. 11:63-70.
- Cunningham, J. P., S. A. West & M. O. Zalucki. 2001. Host Selection in Phytophagous Insect: A New Explanation for Learning Adults. *Oikos*. 95: 537-543.
- Daly, H.V., J.T. Doyen & P. R. Ehrlich. 1978. *Introduction to Insect Biology and Diversity*. International Student Edition. 564p.
- Dethier, V. G. 1982. Mechanism of Host-Plant Recognition. *Entomologia Experimentalis et Applicata*. 31: 49-56.
- [Diperta DIY] Dinas Pertanian Daerah Istimewa Yogyakarta. 2016. *Data Luas Serangan OPT Bawang Merah*. Dinas Pertanian DIY.
- Ehler, L. E. 2007. Impact of Native Predators and Parasites on *Spodoptera exigua*, an Introduced Pest of Alfalfa Hay in Northern California. *BioControl*. 52: 323-338.
- Evans, H., E., 1984. *Insect Biology*. Addison-Wesley Publishing Company. Canada. 436p.
- Faharani, S., A. A. Talebi & Y. Fathipour. 2011a. Life Cycle and Fecundity of *Spodoptera exigua* (Lep: Noctuidae) on Five Soybean Varieties. *Journal of Entomological Society of Iran*. 30: 1-12.
- Faharani, S., B. Naseri & A. A. Talebi. 2011b. Comparative Life Table Parameters of the Beet Armyworm *Spodoptera exigua* Hübner (Lepidoptera, Noctuidae)



- on Five Host Plants. *Journal of Entomological Research Society*. 13: 91-101.
- Fang, W. S., Z. Qian, Z. Xue & W. F. Hao. 2017. Effect of Maternal Sex Ratio on the Reproductive Potential of the Beet Armyworm, *Spodoptera exigua*. *Chinese Journal of Applied Entomology*. 54: 440-445.
- Gardiner, M. M., D. A. Landis, C. Gratton, C. D. DiFonzo, M. O'Neal, J. M. Chacon, M. T. Wayo, N. P. Schmidt, E. E. Mueller & G. E. Heimpel. 2009. Landscape Diversity Enhances Biological Control of an Introduced Crop Pest in the North-Central USA. *Ecological Applications*. 19: 143-154.
- Geetha, S. & K.S. Jagadish. 2014. Field Life Table Studies of *Spodoptera litura* (F.) Infesting Sunflower in Bengaluru Conditions, Karnataka, India. *Global Journal of Biology, Agriculture & Health Sciences*. 3: 55-58.
- Godfray, H. C. J. & M. S. Chan. 1990. How Insecticides Trigger Single-Stage Outbreaks in Tropical Pests. *Functional Ecology*. 4: 329-337.
- Gols, R. & E. H. Poelman. 2015. Editorial Overview: Ecology: Ecology of Plant Insect Interactions: the Role of Plant Chemistry. *Current Opinion in Insect Science*. 8: 4-6.
- Greenberg, S. M., T. W. Sappington, B.C. Legaspi, JR., T. X. Liu & M. Setamou. 2001. Feeding and Life History of *Spodoptera exigua* (Lepidoptera: Noctuidae) on Different Host Plant. *Annals of the Entomological Society of America*. 94: 566-575.
- Hawkins, B. A., H. V. Cornell & M. E. Hochberg. 1997. Predators, Parasitoids, and Pathogens as Mortality Agents in Phytophagous Insect Populations. *Ecology*. 78: 2145-2152.
- Haye, T., P.G. Mason, L.M. Dossall & U. Kuhlmann. 2010. Mortality Factors Affecting the Cabbage Seedpod Weevil, *Ceutorhynchus obstrictus* (Marsham), In Its Area of Origin: A Life Table Analysis. *Biological Control*. 54: 331-341.
- Heard, T.A. 1999. Concepts in Insect Host-Plant Selection Behaviour and Their Application to Host Specificity Testing. *Proceedings of Session: Host Specificity Testing of Exotic Arthropod Biological Control Agents – The Biological Basis for Improvement in Safety*. 1-10.
- Heyne, K. 1987. *Tumbuhan Berguna Indonesia*. Badan Litbang Kehutanan. Jakarta. 616p.
- Hoffman, M. P., A. C. Frodsham. 1993. *Natural Enemies of Vegetable Insect Pest*. Cooperative Extension. Cornell University. Ithaca. 63p.
- Idris, A.B., O. Emelia. 2001. Development and Feeding Behaviour of *Spodoptera exigua* L. (Lepidoptera: Noctuidae) on Different Food Plants. *OnLine Journal of Biological Sciences*. 1: 1161-1164.
- Jiang, X. F., L. Z. Luo & T. W. Sappington. 2010. Relationship of Flight and Reproduction in Beet Armyworm, *Spodoptera exigua* (Lepidoptera: Noctuidae), a Migrant Lacking the Oogenesis-Flight Syndrome. *Journal of Insect Physiology*. 56: 1631-1637.
- Jung CR, Y.J. Park & K.S. Boo. 2013. Optimal Sex Pheromone Composition for Monitoring *Spodoptera exigua* (Lepidoptera: Noctuidae) in Korea (abstrak). *Journal of Asia-Pacific Entomology*. 6: 175-182.



- Kalshoven, L. G. E. 1981. The Pest of Crops in Indonesia. (Revised and translated by PA van der Laan). PT. Ichtar Baru-van Hoeve. Jakarta.
- Kaufman L. V. & M. G. Wright. 2009. The Impact of Exotic Parasitoids on Populations of a Native Hawaiian Moth Assessed Using Life Table Studies. *Oecologia*. 159: 295-304.
- Kementerian Pertanian. 2014. Pestisida Pertanian dan Kehutanan Terdaftar. Direktorat Jenderal Prasarana dan Sarana Pertanian. Kementerian Pertanian. 822p.
- Khaliq, A., M. Javed, M. Sohail & M. Sagheer. 2014. Environmental Effects on Insects and Their Population Dynamics. *Journal of Entomology and Zoology Studies*. 2: 1-7.
- Kishi, M., N. Hirschhorn, M. Djajadisastra, L.N. Satterlee, S. Strowman & R. Dilts. 1995. Relationship of Pesticide Spraying to Signs and Symptoms in Indonesian Farmers. *Scandinavian Journal of Work, Environment & Health*. 21: 124-133.
- Kwon, M., H. M. Cho & Y. J. Ahn. 2006. Relationship between Feeding Damage by Beet Armyworm, *Spodoptera exigua* (Lepidoptera: Noctuidae) and Leaf Trichome Density of Potato. *Journal of Asia-Pacific Entomology*. 9: 361-367.
- Landis, D. A., F. D. Menalled, A. C. Costamagna & T. K. Wilkinson. 2005. Manipulating Plant Resources to Enhance Beneficial Arthropods in Agriculture Landscapes. *Weed Science*. 53: 902-908.
- Lopez, V. M. & M. S. Hoddle. 2013. Mortality Factors Affecting *Agrillus aurogattus* Schaeffer (Coleoptera: Buprestidae) Eggs in the Native and Invaded Ranges. *Biological Control*. 67: 143-148.
- Majumdar, A. & T. Reed. 2013. Pheromone Traps for Monitoring Insect Pests. Alabama Cooperative Extension System. www.aces.edu. 4p. [diakses 25 Oktober 2016]
- Manrique V., R. Diaz, S.D. Hight & W.A. Overholt. 2011. Evaluation of Mortality Factors Using Life Table Analysis of *Gratiana boliviana*, A Biological Control Agent of Tropical Soda Apple in Florida. *Biological Control*. 59: 354-360.
- Maqsood, S., M. Afzal, A. Aqeel, A. B. M. Reza & W. Wakil. 2016. Influence of Weather Factors on Population Dynamics of Armyworm, *Spodoptera litura* F. on Cauliflower, *Brassica oleracea* in Punjab. *Pakistan Journal of Zoology*. 48: 1311-1315.
- Mardani-Talei, M., G. Nouri-Ganbalani, B. Naseri, M. Hassanpour. 2012. Life History Studies of the Beet Armyworm, *Spodoptera exigua* (Hübner) (Lepidoptera: Noctuidae) on 10 Corn Hybrids. *Journal of Entomology Society*. 14: 09-18.
- Marino, P. C. & D. A. Landis. 1996. Effect of Landscape Structure on Parasitoid Diversity and Parasitism in Agroecosystems. *Ecological Applications*. 6: 276-284.
- Marx, J. L. 1973. Insect Control (I): Use of Pheromones. *Science*. 180(1): 736-737.
- Meilin, A. 2014. Hama dan Penyakit pada Tanaman Cabai serta Pengendaliannya. Balai Pengkajian Teknologi Pertanian (BPTP) Jambi. Jambi. 20p.



- Merkhou, F., A. A. Talebi, S. Moharramipour & V. H. Naveh. 2012. Demographic Parameters of *Spodoptera exigua* (Lepidoptera: Noctuidae) on Different Soybean Cultivars. *Journal of Environmental Entomology*. 31: 326-332.
- Michaud, J. P., 1990. Conditions for the Evolution of Polyphagy in Herbivorous Insects. *Oikos*. 57: 278-279.
- Mikkola, K. 1970. The Interpretation of Long-Range Migrations of *Spodoptera exigua* Hb. (Lepidoptera: Noctuidae). *Journal of Animal Ecology*. 39: 593-598.
- Miller, J. C. & L. E. Ehler. 1978. Parasitization of *Spodoptera praefica* Larvae in Hay Alfalfa. *Journal of Environmental Entomology*. 7: 744-747.
- Mitchell, E. R. 1975. Disruption of Pheromonal Communication among Coexistent Pest Insect with Multichemical Formulations. *BioScience*. 25: 493-499.
- Mitchell, E. R. 1986. Pheromones: As the Glamour and Glitter Fade: The Real Work Begins. *The Florida Entomologist*. 69: 132-139.
- Moekasan, T. K. & R. S. Basuki. 2007. Status Resistensi *Spodoptera exigua* Hubn. pada Tanaman Bawang Merah Asal Kabupaten Cirebon, Brebes, dan Tegal terhadap Insektisida yang Umum Digunakan Petani di Daerah Tersebut. *Jurnal Hortikultura*. 17: 343-354.
- Moekasan, T.K., W. Setiawati, F. Hasan, R. Runa & A. Somantri. 2013. Penetapan Ambang Pengendalian *Spodoptera exigua* pada Tanaman Bawang Merah Menggunakan Feromonoid Seks. *Jurnal Hortikultura*. 23: 80-90.
- Nelly, N., Reflinaldon & K. Amalia. 2015. Keragaman Predator dan Parasitoid pada Pertanaman Bawang Merah: Studi Kasus di Daerah Alahan Panjang, Sumatera Barat. *Prosiding Seminar Nasional Masyarakat Biodiversitas Indonesia*. 1: 1005-1010.
- Norris, R. F. & M. Kogan. 2000. Interaction between Weeds, Arthropod Pests, and Their Natural Enemies in Managed Ecosystems. *Weed Science*. 48: 94-158.
- Nusyirwan, 2013. Studi Musuh Alami (*Spodoptera exigua* Hbn) pada Agroekosistem Tanaman Bawang Merah. *Pertanian Terapan*. 13: 33-37.
- Patlak, M., T. Baker, M. Berenbaum, R. Cardé, T. Eisner, J. Meinwald, W. Roelofs & D.W. Beyond. 2003. Insect Pheromones Mastering Communication to Control Pest. *National Academy of Sciences*. <http://www.nasonline.org/publications/beyond-discovery/insect-pheromones.pdf>. [diakses 3 Juli 2015].
- Pemerintah Kabupaten Bantul, 2018. Pemerintah Kabupaten Bantul. <https://bantul.kab.go.id/kecamatan/Sanden.html>. [diakses 20 September 2018].
- Price, P.W. 1984. *Insect Ecology*. John Willey & Sons. United States of America. 607p.
- Odum, H. T. & B. Odum. 2003. Concepts and Methods of Ecological Engineering. *Ecological Engineering*. 20: 339-361.
- Qiu, B., Z. Zhou & Z. Xu. 2013. Age Preference and Fitness of *Microplitis manilae* (Hymenoptera: Braconidae) Reared on *Spodoptera exigua* (Lepidoptera: Noctuidae). *The Florida Entomologist*. 96: 602-609.



- Rao, M. S., D. Manimanjari, A. C. R. Rao, P. Swathi & M. Maheswari. 2014. Effect of Climate Change on *Spodoptera litura* Fab. On Peanut: A Life Table Approach. *Crop Protection*. 66: 98-106.
- Rauf, A. 1999. Dinamika Populasi *Spodoptera exigua* (Hübner) (Lepidoptera: Noctuidae) pada Pertanaman Bawang Merah di Dataran Rendah. *Bulletin of Plant Pests and Diseases*. 11: 39-47.
- Roelofs, W. L. 1980. Developing the Potential of Lepidopterous Pheromones in Insect Control of Pest Organisms. *Ecological Bulletins*. 31: 25-40.
- Royama, T. 1981. Evaluation of Mortality Factors in Insect Life Table Analysis. *Ecological Monographs*. 51: 495-505.
- Ruberson, J. R., G. A. Herzog, W. R. Lambert & W. J. Lewis. 1994. Management of the Beet Armyworm (Lepidoptera: Noctuidae) in Cotton: Role of Natural Enemies. *The Florida Entomologist*. 77: 440-453.
- Sertkaya, E., A. Bayram & S. Kornosor. 2004. Egg and Larval Parasitoids of the Beet Armyworm *Spodoptera exigua* on Maize in Turkey. *Phytoparasitica*. 32: 305-312.
- Silverstein, R. M. 1981. Pheromones: Background and Potential for Use in Insect Pest Control. *Science, New Series*. 213: 1326-1332.
- Slansky, Jr., F. 1990. Insect Nutritional Ecology as a Basis for Studying Host Plant Resistance. *The Florida Entomologist*. 73: 359-378.
- Speight, M.R., M.D. Hunter & A.D. Watt. 1999. *Ecology of Insects: Concept and Applications*. Blackwell Science. United Kingdom. 350p.
- Stiling, P. 1988. Density-Dependent Processes and Key Factors in Insect Population. *Journal of Animal Ecology*. 57: 581-593.
- Ueno, T. 2015. Beet Armyworm *Spodoptera exigua* (Lepidoptera: Noctuidae): a Major Pest of Welsh Onion in Vietnam. *Journal of Agriculture and Environmental Sciences*. 4: 181-185.
- Untung, K. 1996. *Pengantar Pengelolaan Hama Terpadu*. Gadjah Mada University Press. Yogyakarta. 273p.
- Varella, A.C., A. C. Menezes-Netto, J. D. de Souza Alonso, D.F. Caixeta, R.K.D. Peterson & O.A. Fernandes. 2015. Mortality Dynamics of *Spodoptera frugiperda* (Lepidoptera: Noctuidae) Immatures in Maize. *PLoS ONE*. 10: 1-12.
- Vinson, S. B. & G. F. Iwantsch. 1980. Host Regulation by Insect Parasitoids. *The Quarterly Review of Biology*. 55: 143-165.
- Wallner, W. E. 1987. Factors Affecting Insect Population Dynamics: Differences between Outbreak and Non-Outbreak Species. *Annual Review of Entomology*. 32: 317-340.
- Welter, S.C., C. Pickel, J. Millar, F. Cave, R.A. Van Steenwyk & J. Dunley. 2005. Pheromone Mating Disruption Offers Selective Management Options for Key Pest. *California Agriculture*. 59. <https://ucanr.edu/repositoryfiles/ca5901p16-69162.pdf>. [diakses 3 Juli 2015].



- Wibisono, I, I., Y. A. Trisyono, E. Martono & A. Purwantoro. 2007. Evaluasi Resistensi terhadap Metoksifenoziida pada *Spodoptera exigua* di Jawa. *Jurnal Perlindungan Tanaman Indonesia*. 13: 127-135.
- Wijaya, S. Wahyudi & Dendi. 2014. Pengaruh Beberapa Cara Pengendalian Hama Ulat Grayak (*Spodoptera exigua* hubn) terhadap Intensitas Serangan dan Pertumbuhan serta Hasil Bawang Merah (*Allium ascalonicum* L.) Kultivar Bima. *Jurnal Agrowagati*. 2: 224-234.
- Yang S., S. Yang, W. Sun, J. LV & R. Kuang. 2009. Use of Sex Pheromone for Control of *Spodoptera litura* (Lepidoptera: Noctuidae) (abstrak). *Journal of the Entomological Research Society*. 11: 27-36.
- Yew, J. Y. & H. Chung. 2015. Insect Pheromones: An Overview of Function, Form, and Discovery. *Progress in Lipid Research*. 59: 88-105.
- Zheng, X. L., X. P. Chong, X. P. Wang & C. L. Lei. 2011. Pupation Behaviour, Depth, and Site of *Spodoptera exigua*. *Bulletin of Insectology*. 64: 209-214.