

HOST PLANTS OF *MYTHIMNA SEPARATA* (WALKER) (LEPIDOPTERA:NOCTUIDAE) IN THE PHILIPPINES AND INVENTORY OF WORLD RECORDS

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ABSTRACT

Mythimna separata (Walker) is an invasive species and a serious pest of corn (cereals), pasture and forage crops in the Philippines. Previous studies on the biology, ecology, and management of this important pest were conducted in the Philippines in late 60's. At present, the host plants of *M. separata* were studied based on fragmental bibliographic information, reports from local government units, as well as field observations in different areas, particularly in Luzon islands where corn is commonly grown. Host plants for mass rearing of the larvae under laboratory conditions were likewise studied at the Biocontrol Laboratory of the National Crop Protection Center, College of Agriculture and Food Science, University of the Philippines Los Baños from November 2019 to May 2022. The literature review and actual field and laboratory observations resulted in a total of 95 larval host plant records belonging to 18 families, majority of which belong to Poaceae (44 species), Brassicaceae (10), Cucurbitaceae (9), and Fabaceae (8). A native open-pollinated variety of corn (IPB var 6) was evaluated to be useful in mass rearing of *M. separata* for about 19 generations because of its suitability and ease of planting and maintenance.

Key words: invasive species, host plant range, paddy armyworm, polyphagous pest

INTRODUCTION

The true armyworm, more commonly known as paddy armyworm, *Mythimna separata* (Walker), is a serious and invasive pest of corn in the Philippines (Cadapan and Sanchez 1972). It is a polyphagous pest which attacks a whole range of host plants, including vegetables, root crops, cucurbits, legumes, cereals, sugarcane, solanaceous crops, fruits, ornamentals, cut flowers, and weeds, with several reports citing varying number of host plants. It was reported that hectares of plants in the field such as corn, sugarcane, and pasture grass, were entirely consumed in a single day (Cadapan and Sanchez 1972). Severe damage during outbreaks were reported in rice, wheat, sorghum and millets in India, Japan, China, Australia, and New Zealand (Sharma and Davies 1983; Jiang et al. 2011; Koyama and Matsumura 2019). In a more recent report, it is a major migratory pest of cereal crops in East Asia, South Asia, and Australia, resulting in significant losses (Li et al. 2021). The difficulty in predicting and preventing outbreaks was attributed to powerful flight capacity, high reproductive potential of females and the high voracity of older larval instars of *M. separata*. Earlier, host plants were identified that sustain adult moths during long-distance migration (Liu et al. 2017). Using core barcode markers and pollen morphology, 13 plant species belonging to nine families, mainly from Angiosperma, Dicotyledonae were identified. Recently, *M. separata* was reported as widespread in 21 countries in Asia and present in Europe (Russia) and Oceania (Australia, Cook Islands, Fiji, New Caledonia, Norfolk Island, New Zealand, Papua New Guinea, Samoa, Solomon Islands, Tonga and Vanuatu (CABI 2022).

Other researchers reported on the responses of *M. separata* to three plant volatiles (Hou et al. 2019), a modified synthetic diet consisting of corn leaf powder – casein, albumin, peptone and cellulose (Jian et al. 2019), cross resistance studies to insecticides (Rasul et al. 2021), application of CRISPR – Cas9 genome editing (Tang et al. 2021), and its biological control using entomopathogenic fungi (Mantzoukas et al. 2022).

Information on the host plants of *M. separata* in the Philippines have been published in the works of Deang (1969), Cadapan and Sanchez (1972), Catindig et al. (1994), and Gabriel (1997). In other countries, literature on host plants covering the periods 1961 to 1981 were reviewed and 33 species in eight families were reported (Sharma and Davies 1983). The Plantwise Knowledge Bank cited 31 species in eight families (CABI 2022).

The study aimed mainly to produce a consolidated list of host plants from the Philippines and abroad and to find host plants suitable for mass rearing of *M. separata* in the laboratory. This new comprehensive and updated list

of host plants will improve the understanding of *M. separata*, its biology, and its management. It can also be useful as a reference for future studies of the pest.

MATERIALS AND METHODS

Survey and field observation of damage on host plants of *M. separata*. Field collection and observation of host plants were conducted from November 2019 to May 2022 in different provinces in Luzon, Philippines, in areas where corn and other crop hosts of *M. separata* are commonly grown. These included the provinces of Tarlac, Pangasinan, Isabela, Cagayan, Laguna, Batangas, and Quezon (Fig. 1). Plants and weeds in and around the corn field were surveyed following the method of van Strien et al. (2013) which is opportunistic in nature, observation of species collected without standardized field protocol and without explicit sampling design, to cover the most extensive area possible in a limited time.

Inclusion of a plant in the list of host plants was based on the presence of *M. separata* larva or larvae observed feeding on the plants and subsequently identified after rearing in the laboratory until adult emergence. The host plants tested in the laboratory as potential host for mass rearing were eggplant, sweet potato, Johnson grass, spring onion, black pigweed, rice, and corn as standard host plant. Host plants were also photographed and collected for identification.



Fig. 1. Survey site in Barangay Bocoohan, Lucena City, Quezon Province, Philippines. (Note: The larvae on the lower left picture were collected by the farmer, which were killed by drowning in a pail of water.)

Evaluation of host plants from published literature and databases. Host plants of *M. separata* were identified using illustrations and descriptions from books, global databases, and journal articles. Assistance from systematists of the Museum of Natural History of the University of the Philippines Los Baños was also sought. Scientific names and family of host plants were validated through The Plant List (<http://www.theplantlist.org/>). Likewise, English names were validated through the Center for Agriculture and Bioscience International (CABI, <https://www.cabi.org>).

Systematic gathering and review of published journal articles, books, handbooks, global databases, and IEC (information, education and communication) materials from the Philippines and abroad were conducted to come up with an updated comprehensive list of reported host plants of *M. separata*.

RESULTS AND DISCUSSION

Based on reports from literature, larvae of *M. separata* feed on at least 94 species and varieties/cultivars of host plants. The list enumerated the host plants reported by earlier workers, mostly citing Deang (1969), Cadapan and Sanchez (1972), Sharma and Davies (1983), Catindig et al. (1994), Gabriel (1997) and CABI Plantwise Knowledge Bank (2022). Additional species were observed and collected as host plants of *M. separata* from the local survey conducted, bringing the total hosts to 95 species/varieties (Table 1).

Table 1. List of host plants of *Mythimna separata* (Walker).

Host Plants			
Family	Scientific name	English Name	References
Aizoaceae	<i>Trianthema portulacastrum</i> L.*	Black pigweed	New record (tested in the laboratory)
Amaranthaceae	<i>Achyranthes bidentata</i> Blume***	Ox knee	Koyama and Matsumura 2019; Yoo boon et al. 2020
	<i>Beta vulgaris</i> L.***	Sugarbeet	Sharma and Davies 1983; Plantwise Knowledge Bank 2019
Amaryllidaceae	<i>Allium fistulosum</i> L.***	Green onion	Koyama and Matsumura 2019; Yoo boon et al. 2020
Asteraceae	<i>Lactuca sativa</i> L.**	Lettuce	Deang 1969
Brassicaceae	<i>Brassica juncea</i> (L.) Czern.**	Mustard	Deang 1969; Gabriel 1997
	<i>Brassica napus</i> L.***	Rape / Rapeseed	Sharma and Davies 1983; Koyama and Matsumura 2019; Yoo boon et al. 2020
	<i>Brassica oleracea</i> var. <i>botrytis</i> L.**	Cauliflower	Deang 1969; Gabriel 1997
	<i>Brassica oleracea</i> var. <i>capitata</i> L.**	Cabbage	Deang 1969; Gabriel 1997; Koyama and Matsumura 2019; Yoo boon et al. 2020
	<i>Brassica oleracea</i> var. <i>italica</i> Plenck**	Broccoli	Deang 1969
	<i>Brassica rapa</i> L.***	Turnip	Sharma and Davies 1983; Plantwise Knowledge Bank 2019
	<i>Brassica rapa</i> subsp. <i>chinensis</i> (L.) Hanelt**	Chinese cabbage	Deang 1969; ; Cadapan and Sanchez 1972; Sharma and Davies 1983; Gabriel 1997; Plantwise Knowledge Bank 2019
	<i>Brassica rapa</i> subsp. <i>Oleifera</i> ***	Turnip rape	Plantwise Knowledge Bank 2019
	<i>Brassica rapa</i> subsp. <i>pekinensis</i> (Lour.) Kitam.***	Napa Cabbage	Plantwise Knowledge Bank 2019
	<i>Raphanus raphanistrum</i> subsp. <i>sativus</i> (L.) Domin**	Daikon	Deang 1969; Gabriel 1997; Kuramitsu et al. 2016; Koyama and Matsumura 2019; Yoo boon et al. 2020
Cannabaceae	<i>Cannabis sativa</i> L.***	Hemp	Sharma and Davies 1983; Plantwise Knowledge Bank 2019
Commelinaceae	<i>Commelina diffusa</i> Burm.f.**	Spreading dayflower	Catindig et al. 1994
Convolvulaceae	<i>Ipomoea batatas</i> (L.) Lam.**	Sweet potato	Deang 1969; Cadapan and Sanchez 1972; Gabriel 1997
Cucurbitaceae	<i>Benincasa hispida</i> (Thunb.) Cogn.**	Wax gourd	Deang 1969, Gabriel 1997
	<i>Citrullus lanatus</i> (Thunb.) Matsum. & Nakai**	Water melon	Deang 1969; Gabriel 1997; Koyama and Matsumura 2019; Yoo boon et al. 2020
	<i>Cucumis melo</i> var. <i>cantalupo</i> Ser.**	Sweet melon	Deang 1969; Gabriel 1997

Host Plants			
Family	Scientific name	English Name	References
	<i>Cucumis sativus</i> L.**	Cucumber	Deang 1969; Cadapan and Sanchez 1972; Gabriel 1997
	<i>Cucurbita maxima</i> Duch**	Squash	Deang 1969; Cadapan and Sanchez 1972; Gabriel 1997
	<i>Lagenaria siceraria</i> (Molina) StandL.*	Calabash	Deang 1969; Gabriel 1997
	<i>Luffa acutangula</i> L.**	Ridged gourd	Deang 1969
	<i>Momordica charantia</i> L.**	Bitter gourd	Deang 1969; Cadapan and Sanchez 1973; Gabriel 1997
	<i>Sechium edule</i> (Jacq.) Sw.**	Chayote	Deang 1969; Gabriel 1997
Cyperaceae	<i>Cyperus brevifolius</i> (Rottb.) Hassk.**	Shortleaf Spikesedge	Catindig et al. 1994
	<i>Cyperus difformis</i> L.**	Smallflower umbrella-sedge	Catindig et al. 1994
	<i>Cyperus iria</i> L.**	Rice flatsedge	Catindig et al. 1994
	<i>Cyperus rotundus</i> L.**	Nutgrass	Sharma and Davies 1983; Catindig et al. 1994; Plantwise Knowledge Bank 2019
	<i>Fimbristylis quinquangularis</i> (Vahl) Kunth**	Grasslike fimbry	Catindig et al. 1994
	<i>Rhynchospora colorata</i> (L.) H.Pfeiff.**	Starrush Whitetop	Catindig et al. 1994
Eriocaulaceae	<i>Eriocaulon sexangulare</i> L.***		Sharma and Davies 1983
Euphorbiaceae	<i>Manihot esculenta</i> Crantz**	Cassava	Cadapan and Sanchez 1972
Fabaceae	<i>Arachis hypogaea</i> L.**	Peanut	Cadapan and Sanchez 1972
	<i>Cajanus cajan</i> (L.) Millsp.***	Pigeon pea	Plantwise Knowledge Bank 2019
	<i>Glycine max</i> (L.) Merr.**	Soybean	Catindig et al. 1994; Koyama and Matsumura 2019; Plantwise Knowledge Bank 2019; Yooboon et al. 2020
	<i>Phaseolus vulgaris</i> L.***	Beans	Sharma and Davies 1983; Kuramitsu et al. 2016; Plantwise Knowledge Bank 2019
	<i>Pisum sativum</i> L.***	Pea	Sharma and Davies 1983; Plantwise Knowledge Bank 2019
	<i>Vigna radiata</i> (L.) R.Wilczek**	Mungbean	Catindig et al. 1994
	<i>Vigna unguiculata</i> (L.) Walp.**	Bush sitao	Cadapan and Sanchez 1972; Catindig et al. 1994
	<i>Vigna angularis</i> (Willd.) Ohwi & H. Ohashi***	Adzuki bean	Koyama and Matsumura 2019; Yooboon et al. 2020
Linaceae	<i>Linum usitatissimum</i> L.***	Linseed	Sharma and Davies 1983; Plantwise Knowledge Bank 2019
Malvaceae	<i>Gossypium arboreum</i> L.**	Cotton	Gabriel 1997
Poaceae	<i>Avena sativa</i> L.***	Oat	Sharma and Davies 1983; Plantwise Knowledge Bank 2019
	<i>Brachiaria distachya</i> (L.) Stapf**	Armgrass millet	Cadapan and Sanchez 1972; Catindig et al. 1994
	<i>Brachiaria mutica</i> (Forssk.) Stapf**	Para grass	Cadapan and Sanchez 1972; Sharma and Davies 1983; Plantwise Knowledge Bank 2019

Host Plants			
Family	Scientific name	English Name	References
	<i>Chloris barbata</i> Sw.**	Swollen finger grass	Catindig et al. 1994
	<i>Chrysopogon aciculatus</i> (Retz.) Trin.**	Love grass	Cadapan and Sanchez 1972
	<i>Cynodon dactylon</i> (L.) Pers.**	Bermuda grass	Sharma and Davies 1983; Catindig et al. 1994
	<i>Dactyloctenium aegyptium</i> (L.) Willd.**	Crowfoot grass	Cadapan and Sanchez 1972; Catindig et al. 1994
	<i>Digitaria ciliaris</i> (Retz.) Koeler**	Habit of summer grass	Catindig et al. 1994
	<i>Digitaria sanguinalis</i> (L.) Scop.**	Hairy crabgrass	Catindig et al. 1994
	<i>Echinochloa colona</i> (L.) Link**	Jungle rice	Gargav et al. 1972; Sharma and Davies 1983; Catindig et al. 1994; Plantwise Knowledge Bank 2019
	<i>Echinochloa crus-galli</i> (L.) P. Beauv.**	Barnyard grass	Catindig et al. 1994; Plantwise Knowledge Bank 2019
	<i>Echinochloa crus-pavonis</i> (Kunth) Schult.**	Gulf cockspur grass	Cadapan and Sanchez 1972
	<i>Echinochloa esculenta</i> (A.Braun) H.Scholz***	Japanese barnyard millet	Sharma and Davies 1983
	<i>Eleusine coracana</i> (L.) Gaertn.***	Finger millet	Sharma and Davies 1983; Plantwise Knowledge Bank 2019
	<i>Eleusine indica</i> (L.) Gaertn.**	Goose grass	Cadapan and Sanchez 1972; ; Sharma and Davies 1983; Catindig et al. 1994
	<i>Eriochloa procera</i> (Retz.) C.E.Hubb.**	Rice weeds	Catindig et al. 1994
	<i>Hordeum vulgare</i> L.***	Barley	Sharma and Davies 1983; Kuramitsu et al. 2016; Plantwise Knowledge Bank 2019
	<i>Imperata cylindrica</i> (L.) Raeusch.**	Cogon grass	Catindig et al. 1994
	<i>Isachne globosa</i> (Thunb.) Kuntze**	Swamp millet	Catindig et al. 1994
	<i>Leersia hexandra</i> Sw.**	Southern cutgrass	Catindig et al. 1994
	<i>Leptochloa chinensis</i> (L.) Nees**	Red sprangletop	Catindig et al. 1994
	<i>Oryza sativa</i> L.**	Rice	Cadapan and Sanchez 1972; Sharma and Davies 1983; Catindig et al. 1994; Gabriel 1997; Chen and Hu 2000; Wang et al. 2006; Kouassi et al. 2009; Kuramitsu et al. 2016; ali et al. 2017; Zhao et al. 2018; Koyama and Matsumura 2019; Plantwise Knowledge Bank 2019; Yooboon et al. 2020
	<i>Panicum maximum</i> Jacq.**	Guinea grass	Cadapan and Sanchez 1972; Catindig et al. 1994
	<i>Panicum miliaceum</i> L.***	Millet	Sharma and Davies 1983; Chen and Hu 2000; ali et al. 2017; Koyama and Matsumura 2019; Plantwise Knowledge Bank 2019; Yooboon et al. 2020

Host plants of Mythimna separata.....

Host Plants			
Family	Scientific name	English Name	References
	<i>Panicum proliferum</i> Lam.***	Little millet	Sharma and Davies 1983
	<i>Panicum repens</i> L.**	Torpedo grass	Cadapan and Sanchez 1972
	<i>Panicum setigerum</i> Retz.***	Little millet	Sharma and Davies 1983
	<i>Panicum sumatrense</i> Roth***	Little millet	Sharma and Davies 1983
	<i>Panicum antidotale</i> Retz.***	blue panicgrass	Plantwise Knowledge Bank 2019
	<i>Paspalidium flavidum</i> (Retz.) A.Camus**	Yellow Watercrown Grass	Cadapan and Sanchez 1972; Catindig et al. 1994
	<i>Paspalum conjugatum</i> P.J.Bergius**	Carabao grass	Cadapan and Sanchez 1972; Catindig et al. 1994
	<i>Paspalum dilatatum</i> Poir.**	Dallis grass	Cadapan and Sanchez 1972
	<i>Paspalum distichum</i> L.**	Knotgrass	Catindig et al. 1994
	<i>Paspalum scrobiculatum</i> L.**	Kodo millet	Catindig et al. 1994
	<i>Pennisetum glaucum</i> (L.) R.Br.**	Pearl millet	Cadapan and Sanchez 1972; ; Sharma and Davies 1983; Plantwise Knowledge Bank 2019
	<i>Pennisetum purpureum</i> Schumach**	Napier grass	Cadapan and Sanchez 1972; Sharma and Davies 1983; Plantwise Knowledge Bank 2019
	<i>Rottboellia exaltata</i> (L.) L.f.**	Itch grass	Cadapan and Sanchez 1972
	<i>Saccharum officinarum</i> L.**	Sugarcane	Cadapan and Sanchez 1972; Sharma and Davies 1983; Gabriel 1997; Plantwise Knowledge Bank 2019
	<i>Secale cereale</i> L.***	Rye	Sharma and Davies 1983; Plantwise Knowledge Bank 2019
	<i>Setaria italica</i> (L.) P.Beauv.***	Foxtail millet	Sharma and Davies 1983; Koyama and Matsumura 2019; Plantwise Knowledge Bank 2019; Yooboon et al. 2020
	<i>Sorghum bicolor</i> (L.) Moench**	Sorghum	Cadapan and Sanchez 1972; Sharma and Davies 1983; Gabriel 1997; Kouassi et al. 2011; Plantwise Knowledge Bank 2019
	<i>Sorghum halepense</i> (L.) Pers.**	Johnson grass	Cadapan and Sanchez 1972; Sharma and Davies 1983; Plantwise Knowledge Bank 2019
	<i>Triticum aestivum</i> L.**	Wheat	Sharma and Davies 1983; Catindig et al. 1994; Gabriel 1997; Chen and Hu 2000; Wang et al. 2006; ali et al. 2017; Zhao et al. 2018; Koyama and Matsumura 2019; Plantwise Knowledge Bank 2019; Yooboon et al. 2020

Host Plants			
Family	Scientific name	English Name	References
	<i>Zea mays</i> L.**	Maize	Cadapan and Sanchez 1972; Sharma and Davies 1983; Catindig et al. 1994; Gabriel 1997; Chen and Hu 2000; Wang et al. 2006; Kouassi et al. 2010; Kuramitsu et al. 2016; ali et al. 2017; Zhao et al. 2018; Plantwise Knowledge Bank 2019
Polygonaceae	<i>Fagopyrum esculentum</i> Moench***	Buckwheat	Koyama and Matsumura 2019; Yooboon et al. 2020
Solanaceae	<i>Capsicum annuum</i> L.**	Pepper	Deang 1969
	<i>Nicotiana tabacum</i> L.***	Tobacco	Sharma and Davies 1983; Plantwise Knowledge Bank 2019
	<i>Solanum lycopersicum</i> L.**	Tomato	Deang 1969; Cadapan and Sanchez 1972
	<i>Solanum tuberosum</i> L.**	Potato	Koyama and Matsumura 2019; Yooboon et al. 2020
	<i>Solanum melongena</i> L.**	Eggplant	Deang 1969; Koyama and Matsumura 2019; Yooboon et al. 2020

Legend: * - new record; ** - previous records for the Philippines; *** - plants reported from other countries and occurring in the country but were not encountered in the field survey including those reported only the genus having representative species in the country.

The host plants in the list belong to 61 genera and are classified under 18 families as follows: 44 species under Poaceae (=Graminae); 10 under Brassicaceae; nine under Cucurbitaceae; eight under Fabaceae (=Leguminosae); six under Cyperaceae; five under Solanaceae; two under Amaranthaceae; and one each under Aizoaceae, Asteraceae, Amaryllidaceae, Cannabaceae, Commelinaceae, Convulvaceae, Eriocaulaceae, Euphorbiaceae, Linaceae, Malvaceae and Polygonaceae.

The host plants of *M. separata* in the Philippines, particularly rice (*Oryza sativa*) and corn (*Zea mays*), were consistently reported by local workers and also observed in this study.

Twenty species in six families were listed as host plants of *M. separata* (Deang 1969) A total of 28 species in 8 families were listed, including 17 preferred and 11 eaten only under stressed conditions. It was reported that host plants, cawitcawitan, *Anchaus echinatus* was not found in the Plant List (plantlist.org), hence, these were omitted on the list (Cadapan and Sanchez 1972). The scientific names of para grass, *Panicum purpurascens* was updated to *Brachiaria mutica* (Forssk) Staph; yellow water crown grass, *Paspalidium flavidum* (Retz.) A. Camus; bittergourd, *Momordica chantia* L. to *M. charantia* L.; sweet potato, *Ipomea batatas* (L.) Poir to *I. batatas* (L.) Lam; tomato, *Lycopersicon esculentum* L. Karsten to *Solanum lycopersicum* L.; pechay, *Brassica chinensis* (L.) to *B. rapa* subsp. *Chinensis* (L.) Hanelt; cassava, *Manihot maritima* Bohl to *M. esculenta* Crantz, and bush sitao, *Vigna sinensis* L. to *V. unguiculata* (L.) Walp. Ten other host plants listed by Cadapan and Sanchez (1972): carrot, arum, asparagus, hyacinth bean, lima bean, okra, roselle eggplant, cane grass and Egyptian paspalidium which were reported as host plants of *Spodoptera litura*, based on the list of Deang (1969), were excluded in the list of host plants of *M. separata*. The list of Gabriel (1997) included mustard, radish, wax gourd, cucumber, bitter gourd, chayote, cotton, and Johnson grass.

In other countries, Sharma and Davies (1983) reviewed the literature on host plants of *M. separata* covering the periods 1961 to 1981 and 33 species in eight families were reported. All of the host plants were included in the list (Table 1) but the nomenclature was updated using The Plant List (theplantlist.org). Sugar beet listed under family Chenopodiaceae was corrected to Amaranthaceae; rape or rapeseed, *Brassica campestris* was changed to *Brassica napus* L.; Chinese cabbage, *Brassica campestris* var. *capitata* to *Brassica rapa* subsp. *chinensis* (L.) Hanelt; jungle rice, *Echinochloa colonum* to *Echinochloa colona* (L.) Link; japanese barnyard millet, *Echinochloa crusgalli* to *Echinochloa esculenta* (A.Braun) H.Scholz; finger millet, *Eleusine coracana* to *Eleusine coracana* (L.) Gaertn.; goose grass, *Eleusine indica* to *Eleusine indica* (L.) Gaertn.; little millet, *Panicum miliare* to *Panicum miliaceum* L.; little millet, *Panicum serigerum* to *Panicum setigerum* Retz.; pearl millet, *Pennisetum americanum* to *Pennisetum glaucum* (L.) R.Br. *Panicum scrobiculatum* was not found in the Plant List, hence, was omitted in the list.

A total of 31 plant species were reported to support complete larval development of *M. separata* pupation and adult emergence (Catinding et al. 1994). Larval survival to pupation was highest on *Leptochloa chinensis* (58%), *Isachne globose* (54%), *Paspalum paspalodes* (53%), and rice (51%). Larval development was shortest on rice (19.2 days) and longest on *Imperata cylindrica* (34.8 days) and *Brachiaria distachia* (37.8 days).

In the present study, of the seven host plants tested under laboratory conditions, *M. separata* when reared on young leaves of corn (IPB var 6) and laid eggs which hatched in 4-5 days, larval period of 17-19 days, pupal period of 10 days, 94% larval survival, 100% pupation of surviving larvae and adult emergence of 96% (Fig. 2).

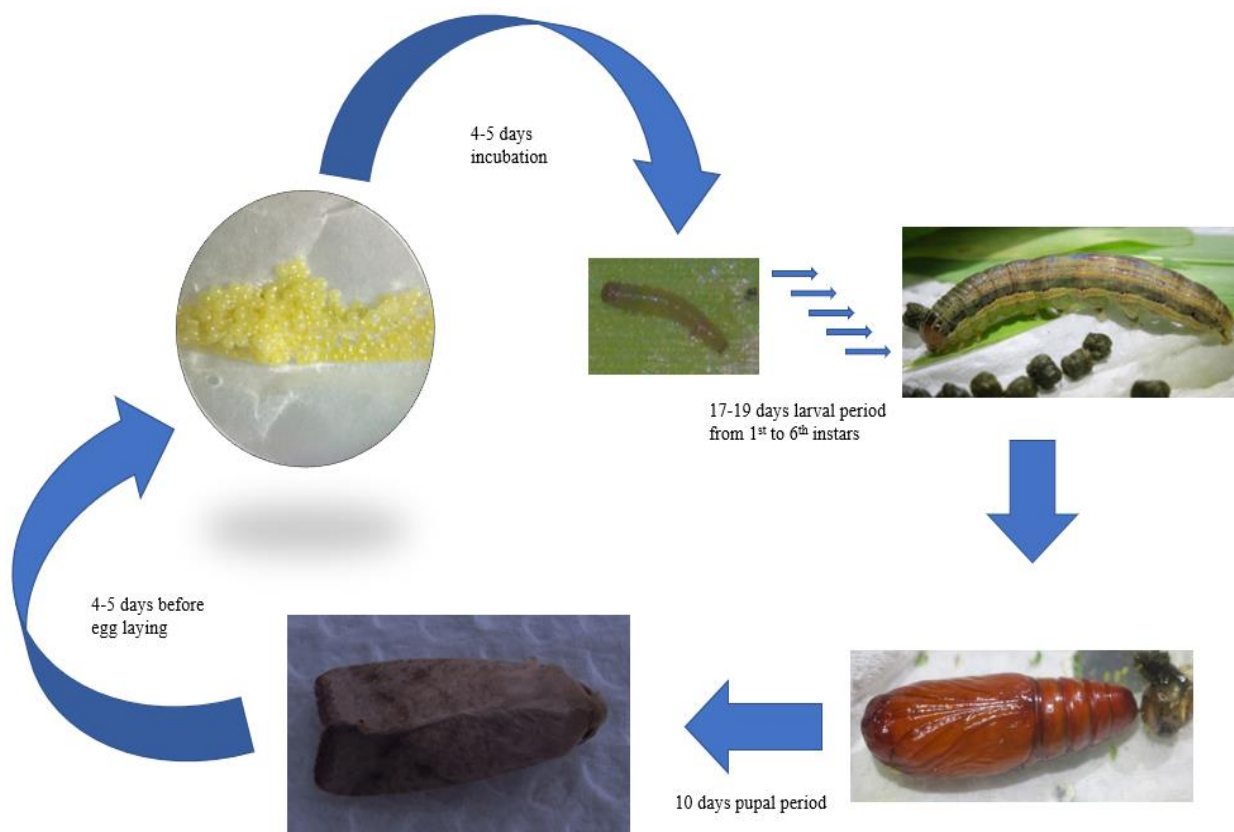


Fig. 2. Life cycle of *Mythimna separata* on young leaves of corn (IPB var 6) under laboratory conditions.

The consolidated global list now has a total of 95 plant species belonging to 61 genera in 18 families, indicating that the pest is highly polyphagous. This polyphagous feeding behavior allows *M. separata* to build or maintain populations on non-crop plants adjacent to or within crop fields, then move to cultivated crops, maximizing crop damage potential. In addition, polyphagous feeding behavior allows *M. separata* to build or maintain its population outside of primary cropping season or outside of cropping areas, contributing to increased pest pressure.

Effective *M. separata* pest management practices must consider the presence of host plants within and around crop fields throughout the year. Knowledge of potential hosts for *M. separata* is an essential component of this approach. This study emphasizes the importance of basic biological information, such as host plant lists, in the development of pest management strategies.

CONCLUSION

The global list of host plants of *M. separata* now has a total of 95 plant taxa belonging to 61 genera in 18 families, indicating that the pest is highly polyphagous. Young leaves of corn (IPB var 6) were found suitable for sustaining 19 generations under laboratory conditions without loss of vitality and vigor of the original population. The information on the host plants is particularly important in the development of pest management strategies against the *M. separata*.

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