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Survey and documentation of Pyraloidea fauna associated with horticulture crops of zone-1 and 2 of Karnataka, India

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ABSTRACT: Pyraloidea is the third largest super family of the order Lepidoptera, and has great economic importance as it causes serious damage to crop plants as a borers, root feeders, seed feeders, leaf rollers and webbers. Survey and documentation of Pyraloidea fauna from their actual hosts is the need of hour for accurate identification and authentication of its host. Survey and documentation of Pyraloidea fauna occurring on horticulture crops of zone-1 and 2 of Karnataka, India revealed a total of 22 identified and 5 unidentified species of Pyraloidea from 711 specimens collected and reared on their respective hosts falling under 20 genera, representing 5 sub-families *viz*., Phycitinae, Epipaschiinae, Spilomelinae, Glaphyriinae and Cybalomiinae. Among 5 sub-families, two sub-families Epipaschiinae and Phycitinae were belonging to Pyralidae, while remaining three sub-families were belong to Crambidae. © 2017 Association for Advancement of Entomology

KEY WORDS: Pyraloidea, horticulture crops, Karnataka, survey, documentation

INTRODUCTION

Karnataka is divided into 10 agro-climatic zones by considering the rainfall pattern, soil types, topography and major crops grown *etc*. The zone-1 (Eastern-transition zone) and zone-2 (North-Eastern dry zone) comprises of 4 districts namely, Bidar, Kalaburagi, Yadagir and Raichur with two districts under each zone, respectively. The major horticultural crops growing in these zones include mango, banana, sapota, brinjal, chilli, onion, cucurbits, zinger, turmeric *etc*., with an area of 0.064 M. ha which represents 3.36 per cent of total horticultural area of Karnataka (Anon., 2014). Among various biotic stresses, the damage and yield loss caused by insect pests are main contributory factor. Insect pests of Pyraloidea have great economic importance as many of them cause serious damage either internally as borers, root feeders and seed feeders or externally as leaf rollers or webbers (Munroe and Solis, 1999; Solis, 1997 and Solis, 2007). The extent of yield loss due to Pyraloidea ranged from 10 to100 per cent across the world (Usua, 1968; Jotwani and Young, 1972).

Most of the pyralid taxonomists have undertaken faunistic studies predominantly by relying on light trap collections and they did not made any efforts

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to associate Pyraloidea species with their host plants except Nagaraj (2014) who made a first effort to survey and document the Pyraloidea fauna associated with major cereals of Hyderabad-Karnataka region. The description of species reared from actual hosts is the need of the hour for accurate identification and authentication of its host. In the zone-1 and 2 of Karnataka, the information pertaining to the fauna of Pyraloidea associated with horticultural crops is not available. In this context, an attempt has been made to survey and documentation of Pyraloidea fauna associated with horticulture crops from zone-1 and 2 of Karnataka, India.

MATERIALS AND METHODS

Intensive collections of Pyraloidea occurring on horticultural crops were made by undertaking survey in different localities of zone-1 (Bidar, Humnabad, Kalaburagi, and Raddewadgi) and zone-2 (Naganoor, Kavadimatti, Raichur and Chandrabanda) of Karnataka once in month from August 2015 to January 2016. The collected specimens transferred to rearing plastic containers / wooden cages along with its host, was monitored / examined carefully twice a day and fresh food was provided to the larvae until attaining pupal stage. Later, pupae were collected and kept for adult emergence in wooden cages / plastic boxes. The rearing room was disinfected with two per cent formaldehyde at regular interval to maintain the hygiene. The emerged adults were killed immediately by using ethyl acetate, pinned, stretched, dried, labeled properly and preserved in insect cabinet boxes at insect repository, Department of Entomology, Agriculture College, Bheemarayanagudi, India. The collected specimens were identified to generic and species level based on the keys developed by Hampson in the Moths volumes of the Fauna of India and adjacent countries series and also using recently available literature (Hampson, 1896).

RESULTS AND DISCUSSION

During the survey, a total of 22 identified and 5 unidentified species of Pyraloidea were documented, out of 711 specimens collected and reared on their respective hosts (Table 1). All the identified and unidentified species were belongs to 20 genera, representing 5 sub-families *viz*., Phycitinae, Epipaschiinae, Spilomelinae, Glaphyriinae and Cybalomiinae. The sub-family Epipaschiinae documented with an identified species, *Orthaga exvinacea* Walker and an unidentified species under genus *Lepidogma* Meyrick. While the sub-family Phycitinae was documented with three species namely, *Etiella zinckenella* Treitschke, *Euzophera perticella* Ragonot, *Nephopterix eugraphella* Ragonot and an unidentified species under genus *Nephopterix* Hübner. Likewise, the sub-family Spilomelinae recorded with 14 species *viz*., *Palpita vitrealis* Rossi, *Syllepte lunalis* Gunee, *Maruca vitrata* Fabricius, *Cirrhochrista brizoalis* Walker, *Diaphania indica* Saunders, *Glyphodes vertumnalis* Guenée, *Omiodes indicata* Fabricius, *Leucinodes orbonalis* Guenée, *Spoladea recurvalis* Fabricius, *Spoladea perspectalis* Hübner, *Conogethes punctiferalis* Guenée, *Synclera univocalis* Walker, *Nausinoe geometralis* Guenée and *Nausinoe perspectata.* The sub-family also comprises three unidentified species under three genera namely, *Conogethes* Meyrick, *Synclera* Lederer and *Nausinoe* Hübner. The sub-family Glaphyriinae was documented with three species namely, *Noorda blitealis* Walker, *Noorda moringae* Tams and *Crocidolomia pavonana* Fabricius. While, the sub-family Cybalomiinae was documented with single species *Hendecasis duplifascialis* Hampson. Similarly, Bhattacharjee (1962) made extensive surveys on Indian Pyralidae for his *Ph.D.* research work, who collected 35 species grouping to 20 genera. In another study, Rose (1982) collected 93 species of pyralid moths falling under 61 genera of sub-family Pyraustinae from North India. Likewise, recently Nagaraj (2014) surveyed for Pyraloidea associated with cereals from Hyderabad-Karnataka region who documented 7 identified and 6 unidentified species. Similar results were also reported by various authors (Rose, 2001; Kirti and Sodhi, 2001; Landry and Brown, 2005; Li, 2006; Landry, 2008; Guillermet, 2008; Du, 2008; Mey, 2008; Qi *et al.* 2011; Sharma, 2011; Jiayu and Houhun, 2012; Li,

Table 1. Species of Pyraloidea collected through survey and reared on horticultural crops from zone-1 and 2 of Karnataka

Insect species	Sub family	Host plant	No.	Remarks
Orthaga exvinacea Walker	Epipaschiinae	Mango	63	Leaf webber
Nephopterix eugraphella Ragonot	Phycitinae	Sapota	65	Leaf webber/ fruit borer
Nephopterix sp.	Phycitinae	Sapota	2	Leaf webber/ fruit borer
Synclera univocalis Walker	Spilomelinae	Ber	2	Leaf webber
Synclera sp.	Spilomelinae	Ber	1	Leaf webber
Syllepte lunalis Gunee	Spilomelinae	Grapevine	41	Leaf webber
Lepidogma sp.	Epipaschiinae	Jamun	29	Leaf webber
Cirrhochrista brizoalis Walker	Spilomelinae	Fig	4	Fruit borer
Spoladea recurvalis Fabricius	Spilomelinae	Amaranthus	28	Leaf webber
Spoladea perspectalis Hübner	Spilomelinae	Amaranthus	1	Leaf webber
Leucinodes orbonalis Guenée	Spilomelinae	Brinjal	111	Shoot and fruit borer
Euzophera perticella Ragonot	Phycitinae	Brinjal	49	Stem borer
Diaphania indica Saunders	Spilomelinae	Cucurbits	59	Leaf webber
Crocidolomia pavonana Fabricius	Glaphyriinae	Cabbage	2	Leaf webber
Omiodes indicata Fabricius	Spilomelinae	Field bean	37	Leaf webber
Maruca vitrata Fabricius	Spilomelinae	Field bean	12	Flower webber
Etiella zinckenella Treitschke	Phycitiinae	Field bean	2	Pod borer
Noorda blitealis Walker	Glaphyriinae	Moringa	24	Leaf webber
Noorda moringae Tams	Glaphyriinae	Moringa	40	Bud borer
Nausinoe geometralis Guenée	Spilomelinae	Jasmine	66	Leaf webber
Nausinoe perspectata Fabricius	Spilomelinae	Jasmine	3	Leaf webber
Nausinoe sp.	Spilomelinae	Jasmine	1	Leaf webber
Palpita vitrealis Rossi	Spilomelinae	Jasmine	21	Leaf webber
Hendecasis duplifascialis Hampson	Cybalomiinae	Jasmine	8	Bud borer
Glyphodes vertumnalis Guenée	Spilomelinae	Jasmine	6	Leaf webber
Conogethes punctiferalis Guenee	Spilomelinae	Guava	18	Fruit borer
Conogethes punctiferalis Guenee	Spilomelinae	Mango	3	Inflorescence borer
Conogethes punctiferalis Guenee	Spilomelinae	Pomegranate	3	Fruit borer
Conogethes sp.	Spilomelinae	Guava	1	Fruit borer
Conogethes sp.	Spilomelinae	Pomegranate	3	Fruit borer
Conogethes sp.	Spilomelinae	Amaranthus	6	Inflorescence borer
Total			**711**	

2012; Sumpich and Skyva, 2012; Yonglin and Houhun, 2012; and Zhang, 2012) across the world.

The documentation of species reared from their actual hosts is the need of the hour for accurate identification and authentication of its host. So, in the current study, Pyraloidea associated with horticultural crops were studied and documented. On jasmine, five species of Pyraloidea were recorded *viz*., *Nausinoe geometralis* Guenée, *Nausinoe perspectata* Fabricius, *Palpita vitrealis* Rossi, *Glyphodes vertumnalis* Guenée and

Hendecasis duplifascialis Hampson. And also, an unidentified species under genus *Nausinoe* Hübner was documented. On leafy vegetable like amaranths, *Conogethes punctiferalis* Guenée, *Spoladea recurvalis* Fabricius, *Spoladea perspectalis* Hübner and an unidentified species under genus *Conogethes* Meyrick were recorded. While on brinjal, field beans and moringa, two species under each were documented namely, *Leucinodes orbonalis* Guenée and *Euzophera perticella* Ragonot, *Maruca vitrata* Fabricius and *Omiodes indicata* Fabricius, *Noorda blitealis* Walker and *Noorda moringae* Tams, respectively. On fruit crops like ber and guava, recorded with single species namely *Synclera univocalis* Walker and *Conogethes punctiferalis* Guenée, respectively. And an unidentified species was also documented under each. Likewise, on other fruit crops like grapes and fig, and vegetables like cabbage were recorded with single species under each *viz*., *Syllepte lunalis* Gunee, *Cirrhochrista brizoalis* Walker and *Crocidolomia pavonana* Fabricius, respectively. While on jamun, one unidentified species was documented.

The current study was the first of its kind that we attempted to survey and document the Pyraloidea taxa purely based on their hosts from zone-1 and 2 of Karnataka. Thus, this host based taxonomy of Pyraloidea helps in authentication of its host. During the survey, a total of 22 identified and 5 unidentified species of Pyraloidea were recorded out of 711 specimens collected and reared on their respective hosts. All the identified and unidentified species belong to 20 genera, representing 5 sub-families *viz*., Phycitinae, Epipaschiinae, Spilomelinae, Glaphyriinae and Cybalomiinae.

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