The northern region of Maharashtra State, India, includes Nashik, Dhule, Jalgaon and Nandurbar districts. This area is bounded in the north-west by the Dang forest, Gujarat, in the north by Madhya Pradesh, by Marathwada region to the east, by Ahmadnagar District to the south, and towards the south-west by Thane District. The area is located between 18°33′–21°6′N & 73°16′–76°28′E, and covers an area of 40,346 km² (Fig. 1).

Northern Maharashtra has a tropical climate, specifically a tropical wet and dry climate in the Koppen climate classification (McKnight & Hess 1884), with a seven-month dry season and a peak of rains in July, receiving rain from both the northeast and southwest monsoons. The temperature is moderately stable, ranging between 20°C and 42°C. The cold season from December to February is followed by the summer season from March to June; June to about the end of September constitutes the south-west monsoon season; and October and November form the post-monsoon season (Greater Bombay District Gazetteer 1960). The forest types found in the area are classified as tropical moist deciduous forest, sub-tropical hill forest and tropical dry deciduous forest (District Gazetteer Nasik District 2010).

Due to the high altitude and favorable conditions, northern Maharashtra has an abundant and diverse flora and fauna. The region has a wide variety of insects, a major component of which is the order Lepidoptera, but scientific documentation of the moth fauna is very much lacking. Insects comprise about 90% of tropical forest biomass (Fatimah & Catherine 2002), but in northern Maharashtra there is little data on the Lepidoptera due to a lack of researchers, who only prefer to work on less diverse taxa. Another problem in assessing insect diversity lies in the deficiency of knowledge of the systematics of the insect fauna of this region, which is due in part to lower conservation efforts towards invertebrates compared to those accorded to large vertebrates and plants (Mahajan 2004). Although 789 species of moths have been recorded from Maharashtra State, from Pune, Satara, Mumbai and Khandala (Cotes & Swinhoe 1887–89), there are no records of the moths found in Nashik, Dhule, Jalgaon & Nandurbar districts.

Megadiverse groups like the insects form a major component of the biodiversity of any area and thus scientific surveying and documentation of this fauna is indispensable to any scientific study and conservation programme. It is not possible to assess the value of a site for conservation without such data (Kendrick 2002). Being a megadiverse taxon with enormous species richness in the tropics, the evaluation of the total species...
richness of all insects would be extremely laborious and time consuming. Therefore, indicator groups, such as moths, are frequently selected as the subject of study. Such a taxon is often selected because it is taxonomically well-known and thus species are relatively rapid to identify (Holloway 1985).

Collection and Identification

The collection of moth specimens were done from Nashik, Dhule, Jalgaon and Nandurbar district of northern Maharashtra during June 2009 to June 2010. The five sites (Table 1) from each district selected for collection. In the present study data was collected from 67 trap nights within the selected sites for about 5hr trapping each night.

The collection of nocturnal moths was undertaken with light traps at a light sheet (Fig. 2 a,b), using either a Philips HQL 125W mercury vapour bulb, Wipro smartlite 20W compact fluorescent lamp or a GE Edison 15W 240V Quad. Several traps had been devised for capturing moths, such as the Rothamsted trap, Heath trap and Robinson trap (Fry & Waring 1996); for this study a light trap (Fig. 2a) was designed based on principles of standard traps. As widely recognized by lepidopterists, many trap designs are not particularly suitable for use in tropical conditions, primarily because they are too small to cope with the enormous catches that are so frequently encountered (Barlow 1982). To overcome these difficulties, most moths were recorded at a light sheet. A white 10’x6’ cloth sheet was hung between two vertical poles and the light source placed in such way that the whole sheet was brightly illuminated. Moths were collected from both forest and residential parts of the study area.

Table 1. Collection data of study area.

<table>
<thead>
<tr>
<th>District</th>
<th>Name of sites</th>
<th>No. of trapping nights</th>
<th>No. of specimens collected</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Nashik</td>
<td>Trimbakeshwar, Igatpuri, Point, Saptashrungi grad, Kalwan.</td>
<td>23</td>
<td>361</td>
</tr>
<tr>
<td>2 Dhule</td>
<td>Sakri, Chhadvel, Sindkheda, Shirpur, Boradi.</td>
<td>15</td>
<td>160</td>
</tr>
<tr>
<td>3 Jalgaon</td>
<td>Chalisgaon, Pachora, Amliner, Chopda, Bhusawal.</td>
<td>16</td>
<td>115</td>
</tr>
<tr>
<td>4 Nandurbar</td>
<td>Navapur, Shahada, Taloda, Toranmal, Virpur.</td>
<td>13</td>
<td>92</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>****</td>
<td><strong>23</strong></td>
<td><strong>728</strong></td>
</tr>
</tbody>
</table>
The moth specimens collected were pinned and labeled in the field. Later, they were further prepared (relaxed, set), sorted to family level and then identified to species in the laboratory.

As noted by many lepidopterists, relaxing, setting and labeling of specimens are both laborious and time consuming procedures (Fatimah & Catherine 2002). Thus, in the present study, species abundance data was recorded in the field and most moths released, with only a small sample collected and prepared as voucher materials which are deposited in the Departmental Insect Reference Museum of KTHM College, Nashik, which is affiliated to Pune University. Cocoons of moths of family Bombycidae were collected from sericulture farms in which Bombyx mori are domesticated for the production of mulberry raw silk. Identification of the moths was carried out with the help of identification keys, standard reference books, and available literature. Species whose identities could not be ascertained from external morphology were studied by dissecting the genitalia with the stereoscopic binocular microscope using standard methods. Species not assigned to species level were given a morphospecies label, pending further investigation, and are held at Zoology Research centre, K.T.H.M. College affiliated to Pune University. They are listed in the checklist as [genus] sp. The classification used mainly follows Holloway (1983, 1985, 1986, 1987b, 1988, 1989, 1994, 1996, 1997, 1999); Kristensen 1999 but also incorporating recent changes in superfamilies Noctuoidea (Lafontaine & Schmidt 2010; van Nieukirken et al. 2011; Zahiri et al. 2010, 2011; Dubatolov & de Vos 2010). Species are listed alphabetically within family and subfamily (Table 2).

Results

A total of 728 moth specimens were collected, which were classified into 245 species (of the 789 species previously recorded from Maharashtra) and placed in 177 genera, and 20 families; the remaining specimens were deposited in Departmental Insect Reference Museum of KTHM College, Nashik, affiliated to Pune University pending further investigation. A preliminary checklist of the moth fauna of northern Maharashtra is presented in Table 2 (Images 1–245 all photographs taken by Sachin A. Gurule).

A larger number of Macrolepidoptera were recorded than Microlepidoptera due to greater efforts taken to record these moths using light sheet and light trap methods rather than other methods, and also due to the difficulty with identification of Microlepidoptera; many of the specimens are thus pending further investigation. The Microlepidoptera superfamilies Tineoidea, Tortricoidea, Cossioidea, Limacodidae, Thyridiidae and Hyblaeidae respectively. The superfamly Pyraloidea is represented by two families Pyralidae and Crambidae. In the present survey, only one species each was recorded from the families Tineidae, Tortricidae, Cossidae and Thyrididae; whereas the families Limacodidae and Hyblaeidae were represented by three and two species respectively. Crambidae are the dominant microlepidopteran family represented by 26 species and Hypsopygia mauritialis is the only representative of the family Pyralidae. The superfamily Lasiocampoidea, which includes only the family Lasiocampidae, is represented by four species. Moths of this family are susceptible to fungi and are
Table 2. Preliminary checklist of moth fauna from northern Maharashtra: their distribution and status.

<table>
<thead>
<tr>
<th>Scientific name</th>
<th>District</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Tineoidea</td>
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<td></td>
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<tr>
<td>I. Family: Tineidae</td>
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<td></td>
</tr>
<tr>
<td>Subfamily: Hapiferinae</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Cimtra seclusella Walker, 1864</td>
<td>NK</td>
<td>R</td>
</tr>
<tr>
<td>B. Tortricoidea</td>
<td></td>
<td></td>
</tr>
<tr>
<td>II. Family: Tortricidae</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subfamily: Olethreutinae</td>
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<td></td>
</tr>
<tr>
<td>2 Loboschia koenigiana Fabricius, 1775</td>
<td>NK</td>
<td>R</td>
</tr>
<tr>
<td>C. Cossoidea</td>
<td></td>
<td></td>
</tr>
<tr>
<td>III. Family: Cossidae</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Xyleutes persona Le Guillou, 1841</td>
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<td>R</td>
</tr>
<tr>
<td>D. Zygaenoidea</td>
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<td></td>
</tr>
<tr>
<td>IV. Family: Limacodidae</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subfamily: Limacodinae</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Hyphomimides argentipunctata Hering, 1931</td>
<td>NK DL</td>
<td>R</td>
</tr>
<tr>
<td>5 Parasa hilaris Westwood, 1848</td>
<td>NK JG</td>
<td>C</td>
</tr>
<tr>
<td>6 Parasa lepida Cramer, 1799</td>
<td>NK NB JG NB</td>
<td>C</td>
</tr>
<tr>
<td>E. Thyridoidea</td>
<td></td>
<td></td>
</tr>
<tr>
<td>V. Family: Thyrididae</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subfamily: Siculodinae</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 Rhodoneura sp. A</td>
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</tr>
<tr>
<td>F. Hyblaeoidea</td>
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<td></td>
</tr>
<tr>
<td>VI. Family: Hyblaeidae</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 Hyblaea constellata Guenee, 1852</td>
<td>NK JG</td>
<td>U</td>
</tr>
<tr>
<td>9 Hyblaea puera Cramer 1777</td>
<td>NK NB U</td>
<td>C</td>
</tr>
<tr>
<td>G. Pyraloidea</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VII. Family: Pyralidae</td>
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<td></td>
</tr>
<tr>
<td>Subfamily: Pyralinae</td>
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<td>C</td>
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<td>VIII. Family: Crambidae</td>
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<tr>
<td>Subfamily: Pyraustinae</td>
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<td></td>
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<td>11 Pyrausta panopealis Walker, 1859</td>
<td>NK C</td>
<td>U</td>
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<tr>
<td>Subfamily: Acentropinae</td>
<td></td>
<td></td>
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<tr>
<td>12 Parapoxyn stagnalis Zeller, 1852</td>
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<td>C</td>
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<tr>
<td>Subfamily: Crambinae</td>
<td></td>
<td></td>
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<tr>
<td>13 Ancylostoma saundersiella Zeller, 1863</td>
<td>NK JG NB</td>
<td>C</td>
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<td>Subfamily: Odontinae</td>
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<td>14 Autocharis fessalis Swinhoe, 1887</td>
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<td>U</td>
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<td>Subfamily: Spilonellinae</td>
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<td></td>
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<tr>
<td>15 Agathodes ostentalis Guenee, 1854</td>
<td>NK JG NB</td>
<td>C</td>
</tr>
<tr>
<td>Subfamily: Spilomelinae</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16 Agrotera basiotata Hampson, 1891</td>
<td>NK DL JG</td>
<td>C</td>
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<table>
<thead>
<tr>
<th>Scientific name</th>
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<tr>
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<tr>
<td>18 Botyodes asiatis Guenee, 1854</td>
<td>NK JG NB</td>
<td>C</td>
</tr>
<tr>
<td>19 Botyodes flavissalis Moore, 1867</td>
<td>NK JG NB</td>
<td>C</td>
</tr>
<tr>
<td>20 Cinchocres braunalis Walker 1859</td>
<td>NK JG NB</td>
<td>C</td>
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<tr>
<td>21 Conopetes punctiferus Guenee, 1854</td>
<td>NK JG NB</td>
<td>C</td>
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<tr>
<td>22 Cydalima latistalis Guenee, 1854</td>
<td>NK JG NB</td>
<td>C</td>
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<tr>
<td>23 Diaphania indica Saunders, 1851</td>
<td>NK JG NB</td>
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<tr>
<td>24 Fillodes fulvadoras Hübner 1832</td>
<td>NK JG NB</td>
<td>C</td>
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<tr>
<td>25 Maruca vittata Fabricius, 1787</td>
<td>NK JG NB</td>
<td>C</td>
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<tr>
<td>26 Omiodes dienemalis Guenee, 1854</td>
<td>NK JG NB</td>
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<tr>
<td>27 Omiodes indica Fabricius, 1775</td>
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<td>C</td>
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<tr>
<td>28 Pardonia distorta Moore, 1886</td>
<td>NK JG NB</td>
<td>C</td>
</tr>
<tr>
<td>29 Parostris marginata Hampson, 1893</td>
<td>NK JG U</td>
<td>C</td>
</tr>
<tr>
<td>30 Pygopilia tyers Cramer, 1780</td>
<td>NK DL JG NB</td>
<td>C</td>
</tr>
<tr>
<td>31 Sameodes cancellalis Zeller, 1852</td>
<td>NK DL JG NB</td>
<td>C</td>
</tr>
<tr>
<td>32 Selaneura recurvulis Fabricius, 1794</td>
<td>NK DL JG NB</td>
<td>C</td>
</tr>
<tr>
<td>33 Terasca egialalis Walker, 1859</td>
<td>NK U</td>
<td>C</td>
</tr>
<tr>
<td>34 Tyspanodes linealis Moore, 1867</td>
<td>NK JG NB</td>
<td>C</td>
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<table>
<thead>
<tr>
<th>Scientific name</th>
<th>District</th>
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<tr>
<td>35 Bombycoidea</td>
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<td>IX. Family: Lasiocampidae</td>
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<td>Subfamily: Lasiocampinae</td>
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<td>36 Antigastra catalaunalis Duponchel, 1833</td>
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<td>37 Botyodes asiatis Guenee, 1854</td>
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<td>38 Botyodes flavissalis Moore, 1867</td>
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<td>39 Cinchocres braunalis Walker 1859</td>
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<tr>
<td>40 Conopetes punctiferus Guenee, 1854</td>
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<tr>
<td>41 Cydalima latistalis Guenee, 1854</td>
<td>NK JG NB</td>
<td>C</td>
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<tr>
<td>42 Diaphania indica Saunders, 1851</td>
<td>NK JG NB</td>
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<tr>
<td>43 Fillodes fulvadoras Hübner 1832</td>
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<tr>
<td>44 Maruca vittata Fabricius, 1787</td>
<td>NK JG NB</td>
<td>C</td>
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<tr>
<td>45 Omiodes dienemalis Guenee, 1854</td>
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<td>46 Omiodes indica Fabricius, 1775</td>
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<td>47 Pardonia distorta Moore, 1886</td>
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<td>48 Parostris marginata Hampson, 1893</td>
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<td>49 Pygopilia tyers Cramer, 1780</td>
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<tr>
<td>50 Sameodes cancellalis Zeller, 1852</td>
<td>NK DL JG NB</td>
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<tr>
<td>51 Selaneura recurvulis Fabricius, 1794</td>
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<td>52 Terasca egialalis Walker, 1859</td>
<td>NK U</td>
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<tr>
<td>53 Tyspanodes linealis Moore, 1867</td>
<td>NK JG NB</td>
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</tbody>
</table>

XII. Family: Sphingidae

Subfamily: Smerinthinae
51 Agnosia microta Hampson, 1907 NK R
52 Marumba dyras Walker, 1856 NK NB C
53 Marumba indicus Walker, 1856 NK DL C
54 Marumba spectabilis Butler, 1875 DL U
55 Polyptychus dentatus Cramer, 1777 NK NB R

Subfamily: Sphinginae
56 Achetaonia lachesis Fabricius, 1798 NK DL JG NB C
57 Achetaonia styx Westwood, 1847 NK DL JG NB C
58 Agrius convolvuli Linnaeus, 1758 NK DL JG C
59 Plistogramma inreto Walker, 1865 NK DL C

Subfamily: Macroglossinae
60 Cephalodes hylus Linnaeus, 1771 NK JG NB U
61 Daphnis neri Linnaeus, 1758 NK DL JG C
62 Hippotion celerio Linnaeus, 1758 NK JG NB C
63 Hippotion rosetta Swinhoe, 1892 NK U
64 Hyles livorna Esper, 1780 NK DL C
65 Leucophaeia emittens Walker, 1866 NK U
66 Leucophaeia lineate Westwood, 1847 NK R
67 Macroglossum belis Linnaeus, 1758 NK R
68 Nephele hespera Fabricius, 1775 NK JG NB C
69 Theretra electa Linnaeus, 1758 NK DL JG NB C
70 Theretra castanea Moore, 1872 NK R
71 Theretra clotho Drury, 1773 NK JG NB C
72 Theretra gnoma Fabricius, 1775 DL C
73 Theretra nessus Drury, 1773 NK DL JG NB C
74 Theretra oldenlandiae Fabricius, 1775 NK JG U

XIV. Family: Uranidae

Subfamily: Microninae
75 Micronia aculeata Guenée, 1857 NK JG NB C

Subfamily: Epeimelinae
76 Phaenusa theclata Guenée, 1857 NK C

XV. Family: Geometridae

Subfamily: Ennominae
77 Amaraica recursaria Walker, 1860 NK C
78 Biston suppressaria Guenée, 1857 NK U
79 Chiasmia cymatodes Wehrli, 1932 NK JG NB C
80 Chiasmia eleonorae Hübner, 1818 NK DL C
81 Chiasmia fidoionata Guenée, 1858 NK JG NB C
82 Chiasmia nora Walker, 1861 NK NB C
83 Heterostegane subtessellata Walker, 1863 NK JG C
<table>
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<tr>
<th>Scientific name</th>
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<td>Spilarctia mona Swinhoe, 1885</td>
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<td>Uthelesia lotrix Cramer, 1777</td>
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<td>Egnasia acingalis Walker, 1858</td>
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<td>Episparsis liturata Fabricius, 1787</td>
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<tr>
<td>Asota producta Butler, 1875</td>
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<tr>
<td>Digama hearseyana similis Moore 1878</td>
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<tr>
<td>Digama marcholii figurate Moore, 1878</td>
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<td></td>
</tr>
<tr>
<td>Pismoda quadripennis Walker, 1858</td>
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<td>Hypena abductalis Walker, 1859</td>
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</tr>
<tr>
<td>Hypena sp. B</td>
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<tr>
<td>Cosmophila lyona Swinhoe, 1919</td>
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<td><strong>Subfamily: Calpinae</strong></td>
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<td>Calyptra minuticornis Guenée, 1852</td>
<td>NK DL U</td>
<td></td>
</tr>
<tr>
<td>Eudocima homoena Hübner, 1823</td>
<td>NK NB C</td>
<td></td>
</tr>
<tr>
<td>Eudocima hynmerestra Cramer, 1780</td>
<td>NK R</td>
<td></td>
</tr>
<tr>
<td>Eudocima materna Linnaeus, 1767</td>
<td>NK DL JG NB C</td>
<td></td>
</tr>
<tr>
<td>Eudocima phalonia Linnaeus, 1763</td>
<td>NK DL JG NB C</td>
<td></td>
</tr>
<tr>
<td>Eudocima salaminia Cramer 1777</td>
<td>NK R</td>
<td></td>
</tr>
<tr>
<td>Oareaia emarginata Fabricius, 1794</td>
<td>NK NB C</td>
<td></td>
</tr>
<tr>
<td><strong>Subfamily: Hypocalinae</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hypocala deforata Fabricius 1792</td>
<td>NK JG NB C</td>
<td></td>
</tr>
<tr>
<td>Hypocala subsatura Guenée, 1852</td>
<td>NK R</td>
<td></td>
</tr>
<tr>
<td><strong>Subfamily: Tinolinae</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Calesis stillifera Felder, 1874</td>
<td>NK R</td>
<td></td>
</tr>
<tr>
<td><strong>Subfamily: Boletobiinae</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eublemma baccalis Swinhoe, 1886</td>
<td>NK JG U</td>
<td></td>
</tr>
</tbody>
</table>
## Moths of northern Maharashtra

### Scientific name | District | Status
--- | --- | ---
193. **Speiredonia mutabilis** Fabricius, 1794 | NK NB | R
194. **Sphingomorpha chlorea** Cramer 1777 | NK | U
195. **Sphingorota retorta** Clerck, 1759 | NK DL JG NB | C
196. **Sphingorota indica** Hampson, 1891 | DL | C
197. **Tattorhynchus exsiccata** Lederer, 1855 | NK NB | R
198. **Thyas coronata** Hübner, 1824 | NK DL | C
199. **Thyas honesta** Hübner, 1806 | NK | C
200. **Trigonodes dissecta** Moore, 1852 | NK DL NB | C

### Subfamily: Eulepidotinae

201. **Anticarsia irrorata** Fabricius, 1781 | NK DL | U

### Miscellaneous taxa

202. **Chilkasa falcata** Swinhoe, 1885 | NK NB | R
203. **Chrysopera combinans** Walker, 1858 | NK DL | C
204. **Ischyja hemiphaea** Cramer, 1776 | NK DL JG | C
205. **Ischyja manlia** Cramer, 1776 | NK R | C

### XVIII. Family: Euteliidae

#### Subfamily: Eulepidotinae

206. **Laphosutra squamigera** Guenée, 1852 | NK R | C

### Subfamily: Stictopterinae

207. **Eutelia blandiatrix** Guenée, 1852 | NK R | C
208. **Paectes subapicalis** Walker, 1858 | NK | C
209. **Pencill aria jocosatrix** Guenée, 1852 | NK R | C

### Subfamily: Euteliinae

210. **Blenina accipiens** Walker, 1858 | NK U | C
211. **Blenina donans** Walker, 1858 | NK NB U | C

### Subfamily: Bagisarinae

212. **Amyna axis** (Guenée, 1852) | NK | C
213. **Chasmina candida** Walker, 1865 | NK R | C
214. **Xanthodes intersepta** Guenée, 1852 | NK DL NB C
215. **Xanthodes malvae** Esper, 1796 | NK DL NB | C
216. **Xanthodes transversa** Guenée, 1852 | NK DL NB | C

### Subfamily: Eustrotiinae

217. **Eustrotia marginata** Walker, 1866 | NK NB | C
218. **Ozara punctigera** Walker, 1865 | DL C
219. **Maliattha quadripalpis** Walker, 1865 | NK JG C
220. **Maliattha sp. A** NK DL C

### Subfamily: Acontiinae

221. **Acontia crocata** Guenée, 1852 | NK NB | C
222. **Acontia nitidula** Fabricius, 1837 | NK R | C

### Subfamily: Aediinae

223. **Conidica dolorosa** Walker, 1865 | NK R | C

### Subfamily: Agaristinae

224. **Episteme adulatrix** Kollar, 1844 | NK DL | R

### Subfamily: Condicinae

225. **Condica dolorosa** Walker, 1865 | NK R | C

### Subfamily: Heliothinae

226. **Heliothis peltigera** Denis & Schiffermüller, 1775 | NK JG NB C

### Subfamily: Eriopinae

227. **Callopistria sp. A** NK R | C

### Subfamily: Noctuinae

228. **Agrotis segetum** Schiffermüller, 1775 | NK DL NB C
229. **Athetis sp. A** JG U | C
230. **Callyna costiplaga** Moore, 1872 | NK JG U | C
231. **Mythimna designata** Walker, 1856 | NK NB C
232. **Mythimna separata** Walker, 1865 | NK DL R | C
233. **Polychroia gregata** Fabricius, 1775 | NK JG NB C
234. **Spodoptera litura** Walker, 1857 | NK C | C

**NK** - Nashik; **DL** - Dhule; **JG** - Jalgaon; **NB** - Nandurbar. **Status**: C - Common (more than 20 specimens recorded); U - Uncommon (more than 5 but fewer than 20 specimens recorded); R - Rare and singletons (single and fewer than 5 specimens recorded).
also attacked by tachinid flies (Chandra 2007). The superfamily Bombycoidea is represented by five families Eupterotidae (three species), Bombycidae (four species), Saturniidae (three species) and Sphingidae (24 species). Family Eupterotidae is represented by the brightly coloured Eupterote fabia, Eupterote lineosa and Eupterote mollifera discrepans. Moths of family Saturniidae often fly late at night, with an irregular flight and are readily attracted towards light. Three species, Actias selene, Antheraea mylitta and Attacus taprobabnis were recorded from Nashik and Jalgaon districts. The superfamily Geometroidea is represented by two families, Uraniiidae (two species) and Geometridae (25 species). The family Uraniiidae is represented by Micronia aculeata and Phazaca theclata. Some species from Geometridae are diurnal and so would have been missed.

The superfamily Noctuoidea is represented by five families; Notodontidae (three species), Erebidae (101 species), Euteliidae (four species), Nolidae (seven species) and Noctuidae (29 species). Recent changes in the classification of this superfamily have resulted in the inclusion of the previous families Arctiidae and Lymantriidae as subfamilies of Erebidae, i.e., as Arctiinae and Lymantriinae (Lafontaine & Schmidt 2010; van Nieukirken et al. 2011; Zahiri et al. 2010, 2011). The moths of subfamily Arctiinae are well represented by brightly coloured tiger and footman moths and moths of the subfamily Lymantriinae are known as tussock moths. Erebidae is thus now the largest of all moth families. Subfamily Erebineae is the largest and includes the tribe Catocalinae (Lafontaine & Schmidt 2010) representing owlet and underwing moths. Family Notodontidae is represented by only three species, Phalera cossoides, Phalera grotei and Paracerura priapus and thus is rare in occurrence.

Discussion
Cotes & Swinhoe (1887–89) and Hampson (1892–1896) listed 4553 and 5277 moth species respectively from India; of which they have reported 789 and 611 moth species principally from western Maharashtra. Mathew et al. (2004) catalogued 202 species of Lepidoptera from Shendurny Wildlife Sanctuary, Kerala, of which 73 were butterflies and 129 were moths from nine families, with Noctuidae (including Erebidae) and Pyralidae the dominant families. Chandra (2007) studied the moth diversity of Madhya Pradesh and Chhattisgarh and recorded 142 species from 90 genera in 16 families, with families Noctuidae (including Erebidae) and Crambidae dominant in that area. Ghosh (2003) studied the geometrid moths of Sikkim and reported 525 species, and cited a total of 460 and 260 species of Geometridae from Meghalaya and West Bengal respectively. Gurule et al. (2010) catalogued 70 species of moths from the family Noctuidae (including Erebidae) in Nashik District of Maharashtra. Siddhu et al. (2010) documented 109 microlepidopteran species in the online version of the Zoological Survey of India. Finally, Rose & Pooni (2004, 2005) recorded 18 species belonging to the superfamily Pterophoridae and 16 species belonging to the superfamily Tortricioidea from the north-western part of India. The above figures indicate that the moth fauna of northern Maharashtra is highly diverse compared to Madhya Pradesh and Uttar Pradesh, despite the fact that the area shows low geometrid species as compared to Meghalaya and West Bengal.

In the present survey, family Erebidae includes most of the species (101), followed by the families Noctuidae (29), Crambidae (26), Geometridae (25) and Sphingidae (24); the noctuid to geometrid ratio found in the survey is 5:1. The surveyed area has a higher proportion of plants from the families Cupressaceae, Menispermaceae, Fabaceae, Malvaceae, Solanaceae, Convolvulaceae, Euphorbiaceae, Mimosaceae, Ebenaceae, Sapotaceae, Sapindaceae, Brassicaceae, Asteraceae, Poaceae, Linaceae and Amaranthaceae, which may serve as indicator taxa for noctuid moths, with lower proportions of plants from families Myrtaceae, Rutaceae, Rhizophoraceae, Periploceae, Combretaceae, Thymelaeaceae, Fagaceae and Santalaceae indicating a rich geometrid fauna (Kitching et al. 2000). The ratio obtained in the present study suggests the moth assemblages recorded are typical of human-disturbed forest of wild and orchid plants with relatively low geometrid component and moderate agriculture and open habitats. The moth fauna of northern Maharashtra is highly diverse but after evaluation of the collection data of the 245 species recorded and identified, it was also observed that due to topographical changes and loss of natural habitats (Mahajan 2004), the populations of many species have declined. As noted above, light trap designs are not particularly suitable for use in tropical conditions, because they are generally too small to cope with the enormous catches that were frequently encountered (Barlow 1982). So samples obtained from the light sheet proved to be extremely valuable for the production of a preliminary checklist of the moth fauna of northern Maharashtra. However, the sampling period is really insufficient to estimate species richness, being relatively short. A more exhaustive survey of all regions is required with other sampling methods, including...
crepuscular netting, baiting, larval searching, diurnal nectaring and malaise trapping, and this is sure to yield new records for this area.

Conclusion

The results of this survey indicate that the moth fauna of northern Maharashtra is characterized by larger proportions of Erebidae, Noctuidae, Crambidae, Geometridae and Sphingidae, which are also among the most diverse families of moths in this region, other families being relatively rare (or at least under-collected, especially Microlepidoptera). Overall, the moth fauna of northern Maharashtra is highly diverse but many species are only uncommonly encountered. Conservation of the area’s flora and plantation by the Forest Division thus helps preserve a reservoir for moth and other insects but more efforts are required towards their scientific documentation and conservation.

A future course of action

Inventorying is the first step in conservation. The list of moths presented here is preliminary, considering the rich faunal diversity of the area; a more comprehensive study is required to document the entire biodiversity present in this area. A detailed survey will be carried out to record the moth fauna of this area with proper scientific documentation. This exhaustive survey of all regions will be conducted using the additional sampling methods noted above. All records will be submitted to the Forest Department and the Zoological Survey of India for documentation.

REFERENCES


LaFontaine, J.D. & B.C. Schmidt (2010). Annotated check list of the Noctuoidea (Insecta, Lepidoptera) of North America north of Mexico, ZooKeys 40: 1–239; <http://dx.doi.org/10.3897/zookeys.40.414>


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Image 1. Cimitra seclusella
Image 2. Loboschiza koenigiana
Image 3. Xyleutes persona.jpg
Image 4. Hyphormides argen-
tipunctata

Image 5. Parasa hilaris
Image 6. Parasa lepida
Image 7. Rhodoneura sp. A
Image 8. Hyblaea constellata

Image 9. Hyblaea puera
Image 10. Hypsopygia mauritialis
Image 11. Pyrausta panopealis
Image 12. Parapoyx stagnalis

Image 13. Ancylolomia saunders-
siella
Image 14. Autocharis fessalis
Image 15. Agathodes ostentalis
Image 16. Agrotera basinotata

Image 17. Antigastra catalaunalis
Image 18. Botyodes asiialis
Image 20. Cirrochresta brizoalis

Image 21. Cnaphalocrocis me-
dinalis
Image 22. Conogethes punctiferalis
Image 23. Cydalima laticostalis
Image 24. Diaphania indica

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Image 25. *Filodes fulviodorsalis*

Image 26. *Glyphodes bivitralis*

Image 27. *Moruca vitrata*

Image 28. *Omiodes diemenalis*

Image 29. *Omiodes indicata*

Image 30. *Pardomima distorta*

Image 31. *Porotis marginata*

Image 32. *Pygospila tyres*

Image 33. *Sameodes cancellolis*

Image 34. *Spoladea recurvalis*

Image 35. *Terostia egialealis*

Image 36. *Tyspanodes linealis*

Image 37a. *Gastropacha pardale*

Female

Image 37b. *Gastropacha pardale*

Male

Image 38. *Kunugia ampla*

Image 39. *Streblote dorsalis*

Image 40a. *Trabala vishnou f*

Image 40b. *Trabala vishnou m*

Image 41. *Eupterote fabia Male*

Image 42. *Eupterote lineosa*

Image 43. *Eupterote mollifera discrepans*

Image 44. *Bombyx mori*

Image 45. *Gunda javanica*

Image 46. *Ocinara sp. A*
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Image 47. *Trilocha varians*

Image 48. *Actias selene*

Image 49. *Antheraea mylitta*

Image 50. *Attacus toprobanis*

Image 51. *Agnosia microta*

Image 52. *Marumba dyras*

Image 53. *Marumba indicus*

Image 54. *Marumba spectabilis*

Image 55. *Polyptychus dentatus*

Image 56. *Acheronitia lachesis*

Image 57. *Acheronitia Styx*

Image 58. *Agrius convoluli*

Image 59. *Psilogramma increta*

Image 60. *Cephonodes hylas*

Image 61. *Daphnis nerii*

Image 62. *Hippotion celerio*

Image 63. *Hippostion rosetta*

Image 64. *Hyles livornica*

Image 65. *Leucophlebia emittens*

Image 66. *Leucophlebia lineate*

Image 67. *Macroglossum belis*

Image 68. *Nephele hespera*

Image 69. *Theretra alecto*

Image 70. *Theretra castanea*
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Image 71. Theretra clotho
Image 72. Theretra gnom
Image 73. Theretra nessus
Image 74. Theretra oldenlandiae

Image 75. Micronia aculeata
Image 76. Phazaca theclata
Image 77. Amraica recursaria
Image 78. Biston suppressaria

Image 79. Chiasmia cymatodes
Image 80. Chiasmia eleonora
Image 81. Chiasmia fidonila
Image 82. Chiasmia nor

Image 83. Heterostegane subtesSELLata
Image 84. Hyperythra lutea
Image 85. Hypomecis sp. A
Image 86. Hyposidra talaca

Image 87. Istrugia disputaria
Image 88. Zeheba aureata
Image 89. Zamarada excisa
Image 90. Agathia laetata
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Image 91. *Agathia* sp. A

Image 92. *Comostola pyrrogona*

Image 93. *Maxates* sp. A

Image 94. *Pelagodes quadraria*

Image 95. *Pingasa* sp. A

Image 96. *Pasiphaea rectangulata*

Image 97. *Problepsis deliaria*

Image 98. *Scopula pulchella*

Image 99. *Scopula subpunctaria*

Image 100. *Scopula* sp. A

Image 101. *Traminda mundisima*

Image 102. *Phalera Cosoides*

Image 103. *Phalera grotei* Male

Image 104. *Paracerura priapus*

Image 105. *Arna* sp. A

Image 106. *Artaxa digramma*

Image 107. *Calliteara grotei*

Image 108. *Olene mendosa* Female

Image 109. *Olene mendosa* Male

Image 110. *Orvasca subnotota*

Image 111. *Perina nuda*

Image 112. *Aloa lactinea*

Image 113. *Amata* sp. A
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Image 158. *Artena dotata*

Image 159. *Attatha regalis*

Image 160. *Bamra mundata* Male

Image 161. *Bastilla arctotaenia*

Image 162. *Bastilla conficiens*

Image 163. *Bastilla crameri*

Image 164. *Bastilla fulvotaenia*

Image 165. *Bastilla joviana*

Image 166. *Bastilla torrida*

Image 167. *Chalciope mygdon*

Image 168. *Entomogramma fautrix*

Image 169. *Ercheia cyllaria*

Image 170. *Erebus caprimulgus* Female

Image 170. *Erebus caprimulgus* Male

Image 171. *Erebus ephesperis*

Image 172. *Erebus hieroglyphica* Female

Image 172. *Erebus hieroglyphica* Male

Image 173. *Erebus macrops* Female

Image 173. *Erebus macrops* Male

Image 174. *Ericeia inangulata*

Image 175. *Grammodes geometrica*

Image 176. *Grammodes stolida*

Image 177. *Hulodes caranea* Female

Image 177. *Hulodes caranea* Male
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Image 199. Thyas honesta
Image 200. Trigonodes disjuncta
Image 201. Anticarsia irrorata
Image 202. Chilkasa falcata Female

Image 202. Chilkasa falcata Male
Image 203. Chrysopera combinans

Image 206. Lophoptera squam-migera
Image 207. Eutelia blandiatrix

Image 210. Blenina donans Female
Image 211. Blenina accipiens

Image 214. Carea angulata
Image 215. Miaromima pangolina

Image 218. Thysanoplusia orichalcea
Image 219. Amyna axis

Image 212. Alteta diurna
Image 213. Alteta rufoflava

Image 216. Westermannia superba
Image 217. Chrysodeixis acuta

Image 220. Chasmina candida
Image 221. Xanthodes intersepta
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