Research Article

A REPORT ON ALTERNANTHERA TRIANDRA LAM. UNIFLORAL ROCK BEE HONEY FROM AHMEDNAGAR (M.S.), INDIA

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ABSTRACT

Studies on pollen analysis of rock bee honey were undertaken during the winter season at Ahmednagar (M.S.), India. Two honey samples were strangely unifloral honeys with Alternanthera triandra representing the predominant pollen type. A. triandra Lam. (Family: Amaranthaceae) is a dominant weed locally referred as Matsyagandha. It is reported in honeys of Apis dorsata, Apis cerana, A. florea and the stingless bees. However, this is an exclusive finding wherein A. triandra Lam. is observed as a ‘predominant’ pollen type in melittopalynological investigation of Apis dorsata honeys.

Keywords: Alternanthera triandra, Pollen analysis, Unifloral honey, Apis dorsata.

INTRODUCTION

Honey pollen analysis makes possible identification of the main nectar sources used by the bees for the production of honey in a region, classifying the honey botanically and geographically as per its origin (Louveaux et al., 1978). The honey produced in Ahmednagar District (M.S.) is rich in pollen types due to the diverse native flora visited by the bees, rock bees in this particular case. There are many endemic plant species with important forage value and are good geographical markers (Lakshmi et al., 1997; Soman et al., 1995; Arif, 2011).

According to Forcone et al. (2003), analysis of the evolution of honey pollen spectrum during the honey flow period is useful to detect the contribution of different bee forage over the season.

Alternanthera triandra Lam. belonging to the family Amaranthaceae is a dominant weed distributed throughout the tropics and sub tropics of America, Africa and Asia. It is a perennial or sometimes annual herb. The stem stands erect, ascending and sometimes creeping. It is widely branched with taproot system. The leaves are linear, oblong or ovate. A. triandra shows cap-like flowering heads that are sessile, shiny white. The fruit is obreniform and corky (www.globinmed.com). Though a nectarless plant, it is frequently visited by the bees for pollen.

The objective of this study was to study the honey samples for evaluating the pollens in them and identifying the main floral source in this region.

MATERIAL AND METHODS

Study area

The city of Ahmednagar (19°5’2.5” N and 74°44’42.9” E) is situated in the South- Eastern region of Western Ghats. The Alternanthera triandra (local name: Matsyagandha) is a herb that predominates in the region (Figure 1). It seems to have replaced the Parthenium hysterophorous as a weed.

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Figure 1. Alternanthera triandra.

Pollen analysis

The pollen content of 10 honey samples of *Apis dorsata* was studied. The honey samples were obtained from the different locations of Ahmednagar (M.S.) during November-December 2010 and January 2011. Such samples are referred as winter honey.

For pollen analysis, we followed the method described by Louveaux *et al.* (1978). A 10gm honey sample was dissolved in 20ml of distilled water and centrifuged for 10 min. at 2500 rpm. The supernatant obtained was discarded while the sediment was acetylised as per technique of Erdtman (1960), mounted in glycerine jelly and sealed with paraffin.

To determine the frequency classes, 600 pollen grains were counted on three slides from each sample. Pollen types were classified into four categories (Louveaux *et al.*, 1978) as predominant pollen ( 45%), secondary pollen (16-45%), important minor pollen (3-15%) and minor pollen ( 3%). The pollens were identified by comparison with the reference slides and pollen identification key (Wodehouse, 1935).

RESULTS

A total of 20 pollen types were identified from the honey samples.

The honey samples were obtained in November 2010, December 2010 and January 2011. These months relate to winter season and have pertinence to the forage resources available to the bees.

The secondary pollen types were represented by *Prunus guajava, Cocos nucifera, Eucalyptus sp., Mangifera indica, Syzygium cumini, Moringa oleifera, Sorghum vulgare* and *Helianthus annuus*.

Important pollen types and minor pollen types were *Brassica niagra, Pongamia pinnata, Ziziphus jujuba, Allium cepa, Zea mays, Argemone Mexicana, Cucurbita sp., Parthenium hysterophorus* and *Justica sp.* However, the most interesting finding is two of the *Apis dorsata* winter honey samples (HS IV and HS IX) being unifloral with *Alternanthera triandra* pollens (Figure 2 and 3) falling in predominant category (45%).
Figure 2. Photograph of Alternanthera sp. pollens.

Figure 3. Photomicrograph of individual Alternanthera sp. pollen.
**Table 1.** Pollen types and their frequency class in the honey samples (HS) from Ahmednagar.

<table>
<thead>
<tr>
<th>Pollen type</th>
<th>HS-I</th>
<th>HS-II</th>
<th>HS-III</th>
<th>HS-IV</th>
<th>HS-V</th>
<th>HS-VI</th>
<th>HS-VII</th>
<th>HS-VIII</th>
<th>HS-IX</th>
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<td><em>Alternanthera triandra</em></td>
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<td><em>Prunus guajava</em></td>
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<td><em>Cocos nucifera</em></td>
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<td><em>Eucalyptus sp.</em></td>
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<td><em>Mangifera indica</em></td>
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<td><em>Coriandrum sativum</em></td>
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<td><em>Brassica nigra</em></td>
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<td><em>Syzygium jambos</em></td>
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<td><em>Pongamia pinnata</em></td>
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<td><em>Zyziphus jujuba</em></td>
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<td><em>Calendula officinalis</em></td>
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<td><em>Allium cepa</em></td>
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<td><em>Moringa oleifera</em></td>
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<td><em>Zea mays</em></td>
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<td><em>Sorghum vulgare</em></td>
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<td><em>Argemone Mexicana</em></td>
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<td><em>Justicia sp.</em></td>
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D = predominant pollen (>45%).
S = secondary pollen (16-45%).
I = important minor pollen (3-16%).
M = minor pollen (<3%).

**DISCUSSION**

Two of the ten honey samples had *Alternanthera triandra* Lam. as predominant pollen type, suggesting it to be of unifloral origin. It is important to emphasize that little is known about the floral biology of the *Alternanthera triandra* Lam. represented in the pollen spectrum, their real nectariferous contribution to honey production or the relationship between pollen and nectar in the pollen spectrum.

The pollens of *Alternanthera triandra* Lam. have been earlier reported in the honeys of *Apis dorsata* (Lakshmi Rao, 1995), *Apis florea* (Bhushari et al., 2005; Jyoti Timande and Tembhare, 2010), *A. cerana* (Vijaya Bhaskar Reddy and Ramchandran Reddy, 2008; Cherian et al., 2011) and in *A. mellifera* (Oliveira et al., 2010). However, none of the reports mention the pollens of *Alternanthera triandra* Lam. as predominant, especially in *A. dorsata* honey. The probable explanation for this unusual finding could be the mixing of unifloral or multifloral pollen loads in the honey pot.

**CONFLICTS OF INTEREST**

The authors declare that there are no conflicts of interest associated with this article.

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