Four individuals of *Nyctimene rabori* were captured at different bat net stations in Barangay Canbantug, Argao town within the peripheries of Mt. Lantoy Key Biodiversity Area in Cebu Island, Philippines at 500–700 meters above sea level. We present the first observation of folivory behavior in *Nyctimene rabori* on mango plant (*Mangifera indica*). The bat feed on young leaves and shoots of the mango plant where it was released. It chewed on the leaves, swallowing some parts and ejecting some. Interestingly, the bat also ate the petiole and the entire young green stem (about 6 in long and 0.5–0.8 cm diameter). It consumed the entire stem with only a small amount expelled. The activity lasted for almost 8 min of intermittent feeding. Fruit bat folivory is rarely documented in the Philippines. Knowledge on the diet of fruit bats is important in the conservation and management of the species.

**Keywords:** folivory, fruit bat, *Mangifera indica*, Mt. Lantoy Key Biodiversity Area, *Nyctimene rabori*

**INTRODUCTION**

Folivory is defined as the consumption of foliage – including leaves, stems, and leaf content (Kunz and Ingalls 1994). The consumption of leaves by bats typically involves intensive mastication to ensure the extraction of nutrients, followed by the disposal of fibrous pellets of indigestible material (Lowry 1989). Leaves are an important component of bat diet as it provides carbohydrates, proteins, and minerals (Nelson *et al.* 2005).

Folivory have been documented in pteropodid bats that feed on a variety of fruits available in different seasons of the year (Raghuram *et al.* 2011). This behavior was once thought to be rare among fruit bats with leaves taken only when other food sources were scarce (Pierson *et al.* 1996).
However, recent studies have shown that leaf-eating is both common and widespread among Old World flying foxes (Tan et al. 1998). Folivory has been reported in Puerto Rico for at least 17 species of Old World Bats (Pteropodidae) and leaves eaten by bats, include 44 species of plants (Kunz and Diaz 1995). Moreover, in Southeast Asia, *Cynopterus brachyotis* is a common frugivorous species. This species was discovered to have fed on the leaves of *Erythrina orientalis*, *E. subumbrans*, *Eugenia grandis*, *Cassia spectabilis*, *Pellacalyx saccardianus*, and *Artocarpus fulvicortex* (Tan et al. 1998).

The most recent and comprehensive review of Philippine bats was detailed in the ‘Synopsis of the Philippine Mammals’ by Heaney et al. (2010). In addition, Ingle et al. (2011) reviewed the status of cave bats, including known roosting cave and karst ecosystems. However, the current data are largely focused on the distribution and diversity of bats in the country (Tanalgo and Hughes 2018). Here we present the first record of folivory behavior in *Nyctimene rabori* in a secondary forest.

We conducted mist netting to capture bats during 08–15 Apr 2018 at Barangay Canbantug, Argao, Cebu, Philippines within the peripheries of Mt. Lantoy Key Biodiversity Area (Figure 1). Four mist nets were established in different locations from ground, understory, and subcanopy nets. Bat net stations are placed in secondary growth and adjacent cultivated areas (Figure 1). The mist nets were checked every 10–20 min from 6:00 PM to 6:00 AM. Three subcanopy nets were set up at 5 m above the ground at Net Station 1 (NS1); four (NS2) and five (NS3) understory nets were set up at 0.5 m and 2 m above the ground, respectively. At Net Station 4 (NS4), three understory nets were set at 2 m above the ground. All mist nets per bat net station were connected in series. Netting efforts for understory and subcanopy nets totaled 75 net-nights.

The forest land in Barangay Canbantug is covered with patches of secondary growth forest containing indigenous and fruit tree species, mostly growing over limestone. The natural forest is mixed with some exotic species such as *Swietenia macrophylla*, *Falcataria moluccana*, etc.

Specific sampling points indicate a single emergent tree that includes *Erythrina stricta* with 15 m height and 42 cm diameter at breast height. Canopy vegetation mostly consists of *Bischofia javanica*, *Lithocarpus robinsonii*, *Palaquium obovatum*, and *Ficus septica* with diameters at breast height ranging 18–48 cm and reaching heights of 12–13 m. The understory consisted of saplings, ground ferns (*Nephelepis* sp.), epiphytic ferns (*Aglaomorpha* sp.), pandan plants (*Pandanus* sp.), and grasses (*Paspalum* sp.).
A total of four individuals of *Nyctimene rabori* were captured at different bat net stations within 500–700 masl (Table 1). The folivory behavior was observed on a female bat at 6:00 AM at the campsite. We hung a female bat on a young branch of a mango species (*Mangifera indica*). After resting on the branch for a few minutes, we observed that the individual bat started to chew the leaves and stem of the tree (Figure 2). The feeding activity started by chewing the leaves first and then the young stem. The bat rapidly chewed the leaves, swallowing some parts while expelling some. Interestingly, the bat also ate the petiole and the entire young green stem (about 6 in long and 0.5–0.8 cm diameter), ejecting only a small amount of fibrous material. The activity of the bat lasted for almost 8 min of intermittent feeding (see supplementary file for full video documentation: https://figshare.com/articles/cebu_BioMeS_tube_nosed_folivory_mp4/7699391).

**Table 1.** Individuals of adult *Nyctimene rabori* with biometrics captured in Barangay Canbantug, Argao, Cebu, Philippines within the peripheries of the Mt. Lantoy Key Biodiversity Area.

<table>
<thead>
<tr>
<th>Individuals of <em>N. rabori</em></th>
<th>Tail length (mm)</th>
<th>Body length (mm)</th>
<th>Hindfoot (mm)</th>
<th>Ear (mm)</th>
<th>Forearm (mm)</th>
<th>Sex</th>
<th>Weight (gm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>19</td>
<td>110</td>
<td>18</td>
<td>14</td>
<td>78</td>
<td>F</td>
<td>80</td>
</tr>
<tr>
<td>2</td>
<td>19</td>
<td>102</td>
<td>17</td>
<td>13</td>
<td>75</td>
<td>M</td>
<td>65</td>
</tr>
<tr>
<td>3</td>
<td>25</td>
<td>105</td>
<td>18</td>
<td>15</td>
<td>74</td>
<td>M</td>
<td>75</td>
</tr>
<tr>
<td>4</td>
<td>18</td>
<td>113</td>
<td>12</td>
<td>17</td>
<td>72</td>
<td>M</td>
<td>80</td>
</tr>
</tbody>
</table>

Fruits are generally sources of energy (carbohydrates), and the leaves are an important source of protein and other minerals for frugivorous bats. Knowledge on the diet and behavior of the bat is important in the management and conservation of the species and their habitat. Identifying food preferences of the species provides information on the potential plant species for use in forest restoration.

**ACKNOWLEDGMENTS**

We are grateful to DOST-PCAARRD-NICER for funding this research project and also to the Cebu Technological University for supporting this research undertaking.

**REFERENCES**


