

with inhibitory activity against pathogenic fungi<sup>14</sup>. An antimicrobial naphthaquinone javanicin has been identified from the endophytic fungus *Chloridium* sp. isolated from *Azadirachta indica*<sup>15</sup>. The fungal naphthalene is synthesized by polyketide synthases (PKSs). *Aspergillus nidulans* wA and *Colletotrichum lagenarium* pks1 coded for iterative type I PKSs and synthesized heptaketide naphthopyrone and pentaketide naphthalene respectively<sup>16</sup>. Recently, two new naphthalene derivatives, 1-(4'-hydroxy-3',5'-dimethoxy-phenyl)-1,8-dimethoxynaphthalene-2(1H)-one and 1,8-dimethoxynaphthalene-2-ol have been identified from an endolichenic fungal strain *Scopulariopsis* sp.<sup>17</sup>. The production of naphthalene by endophytic fungus may be related to restrict the growth of other fungal competitors in its natural environment<sup>3</sup>.

The amplified ITS region of rDNA of endophytic fungus produced 727 bp long sequence (Figure 1). The BLAST search of this ITS sequence revealed 99% similarity with the deposited sequence of *P. herbarum*. This ITS sequence was deposited at NCBI GeneBank with accession no. JN163857. The fungus was deposited at the Culture Bank of Department of Botany, Banaras Hindu University (BHU), Varanasi with isolate no. MMTL/AMH 350.

The species of *Phoma* are common in fungal endophytic census and a gibberellin-producing endophytic *P. herbarum* was isolated from roots of salt-stressed soybean (*Glycine max*) plant. Interestingly, almost all forms of gibberellin, especially GA4 and GA7, were found in higher amounts in conjunction with

physiologically inactive GA9, GA12, GA15, GA19 and GA20 in culture of *P. herbarum*<sup>18</sup>.

This report suggests that naphthalene derivative produced by endophytic fungus may be warding off the plants from pathogens of *A. marmelos*. Future research on this fungus may provide clues on the biosynthetic mechanism of naphthalene and may enhance the production of naphthalene for commercial purpose.

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ACKNOWLEDGEMENTS. S.K.G. thanks CSIR, New Delhi for JRF and SRF. We thank the Head, Department of Botany, BHU for facilities; Prof. Gopal Nath (IMS, BHU) for providing cultures of human pathogenic bacteria and NIPER, Chandigarh for GCMS analysis. R.N.K. and S.K.G. thank DST and UGC, New Delhi for financial support respectively.

Received 9 January 2013; revised accepted 14 May 2013

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## Resource partitioning between two 'near threatened' heronry species – a case of nest sharing between Painted stork (*Mycteria leucocephala*) and Black-headed ibis (*Threskiornis melanocephalus*)

Selection of a nest site can be viewed as an adaptive trade-off between the cost of searching and defending the site and the reproductive benefits of selecting a site enhancing reproductive success<sup>1,2</sup>. Differential resource selection is also one of the major factors allowing the coexistence of species<sup>3,4</sup>. However, when a species has a specific nesting requirement, suitable nesting locations may be

difficult to obtain<sup>5,6</sup>, which may cause the overlap of nesting sites<sup>7</sup>.

Members of the order Ciconiiformes (storks, ibises, egrets, etc.) are well known as heronry-forming species that nest communally during their breeding season, which is more or less the same for heronry-forming species. Black-headed ibis (BHI) and Painted stork (PS) are also heronry species and are classi-

fied as 'Near Threatened' according to the IUCN Red list of species (Birdlife International, 2001).

Oriental white ibis, now also referred to as black-headed ibis (*Threskiornis melanocephalus* Latham), is a nomadic, ciconiiformes that frequents shallow wetland habitats in India<sup>8–10</sup>. Its breeding season is from June to August in North India, November to February in South



**Figure 1.** a, Eggs laid by Black-headed Ibis in the nest of Painted stork. b, Nest containing eggs of both the species and a nest of Black-headed ibis in the background.

India<sup>11</sup> and late June to October in Saurashtra region (Gujarat), depending on the monsoonal conditions<sup>12</sup>. PS also considerably shares similar habitats and breeds during July to October<sup>13</sup>.

The Indroda Nature Park, located in the capital city of Gandhinagar in Gujarat, has an aviary which houses 17 species (6 species of ducks, 2 species of cranes, 2 species of herons, 2 species of egrets, 2 species of ibis, 2 species of storks and 1 species of spoonbill) of birds, of which 9 are heronry-forming species. The aviary also has tall trees like *Azadirachta indica*, *Holoptelea integrifolia*, *Syzigium cumini*, *Ficus racemosa* and *Ficus benghalensis*, which support nesting of these heronry species. These species regularly breed in the aviary and the nests are used repeatedly during every breeding cycle.

An incident of nest sharing was observed in the Indroda Nature Park, during the breeding season of July 2009, between PS and BHI. The nest was built by PS on a neem tree (*A. indica*), which also had three other nests each of PS and BHI (Figure 1). The eggs were first laid by PS and then after a gap of 6 days, egg-laying was done by the BHI. The incubation was done by both species alter-

natively. However, BHI could incubate the eggs only in the absence of PS (when it was away for feeding) and could spend only 20–30 min (in the evening) for incubation, as it was chased away by the PS on its arrival back to the nest. However, the nest was vigorously monitored by both the species.

The nest was monitored for 40 days, till the hatchlings emerged from the eggs. The PS had successful nesting as both the eggs were incubated successfully after 29 days. The eggs of BHI did not hatch may be due to insufficient time spent by it for incubation. Later, the eggs of BHI were damaged by the PS chicks and were eaten.

The event of nest sharing could be due to analogous breeding characteristics shared by both the species, viz. nesting season and clutch size (June to October for BHI<sup>13</sup>, and July to October for PS<sup>14</sup>, clutch size 2–4 eggs by BHI<sup>14</sup> and 2–5 eggs by PS<sup>14</sup>). Additionally, the limited space for a nest construction and inter-species competition for a suitable and safe nesting site would have compelled BHI to lay its eggs in the nest of PS.

The event of nest sharing can also be attributed to rapid urbanization that has taken place in the immediate vicinity of

Gandhinagar city. As a result, these species have no alternative but to use limited traditional and protected sites for nesting.

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Received 11 December 2012; revised accepted 9 May 2013

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