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RESEARCH NOTE

New record of infestation of Malabar Parakeet [*Psittacula columboides* (Vigors, 1830)] on small cardamom

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ABSTRACT: A large-scale infestation of the Malabar parakeet, *Psittacula columboides* (Vigors, 1830), is reported on small cardamom [*Elettaria cardamomum* (L.) Maton; *Zingiberaceae*] for the first time. Nearly one hundred hectares of cardamom area was infested by *P. columboides,* and more than seventy-five farmers were affected in the Cardamom Hill Reserve area, Idukki district, Kerala, India. The bird has been causing damage to the economic part of the plant (capsule) by scooping the fruit surface with its beak and feeding on the internal content. Ground-level feeding and considerable damage to the cardamom capsules by *P. columboides* were unusual and unexpected. The possible reasons for the massive occurrence of this bird species and strategies to manage it in this unique agro-ecosystem were discussed.

Keywords: Cardamom Hill Reserves, *massive occurrence, parakeets, damage*

Small cardamom [*Elettaria cardamomum* (L.) Maton; Zingiberaceae], a native of the moist evergreen forests of the Western Ghats of southern India, is widely cultivated for its spicy aromatic capsules in the Indian Cardamom Hills (Ravindran, 2002). India is the second-largest producer, and the Cardamom Hill Reserves (CHR) in Kerala contributes nearly 90% of India's cardamom production (Spice Board, 2024). The CHR, a part of the southern Western Ghats, is a tropical high-upland, mid-elevation evergreen forest surrounded by the Periyar Tiger Reserves, Kannandevan Hills and Thodupuzha Ranges (Pascal *et al*., 2004; Murugan *et al*., 2006). Bio-geographical peculiarities of the growing area as well as high-value nature of the crop make the cardamom agro-ecosystem unique and pest-intensive in nature (Nafeesa *et al*., 2024). Both vertebrate and invertebrate pest species are causing considerable threat to the cardamom crop (Chakravarthy and Srihari, 2000; Gopakumar and Chandrasekar, 2002). There are over sixty-seven invertebrate (Gopakumar and Chandrasekar, 2002; Joshi *et al*., 2023) and twelve vertebrate (Chakravarthy and Srihari, 2000) pest species known to cause damage to cardamom crops.

The blue-winged parakeet, or Malabar parakeet (*Psittacula columboides*), is a species of parakeet resident to the Western Ghats, and they are mainly found in upland (most abundant in the hills between 1500 and 3500 ft. msl) evergreen rainforest but also in deciduous forest with bamboo and abandoned coffee and rubber fields (Juniper and Parr, 2010; Grimmett *et al*., 2014). The diet of *P. columboides* is mainly grains and fruits, especially wild figs; also, flower petals and nectar (Salim Ali, 2002). The species has been assessed for the IUCN Red List of Threatened Species and has been listed as "Least Concern" (IUCN RED LIST, 2024). Avian species, *viz*., red spur fowl (*Galloperdix spadicea* G.), red jungle fowl (*Gallus* spp.) and grey jungle fowl (*Gallus sonneratii* T.) were already reported to be feeding on cardamom capsules (Chakravarthy and Srihari, 2000). The infestation of *P. columboides* and the nature of damage on small cardamom reported here is a new record.

Information on the massive infestation of parrots on cardamom crops was received from the 'Mavadi' area of the Nedumkandam block in Idukki District, Kerala, India, during the 2nd week of September 2024. Scientists from the Cardamom Research Station, Kerala Agricultural University, Pampadumpara, confirmed the information on inspecting the farmers' fields (9.869997N, 77.117054E; 9.871296N, 77.113184E; 9.882161N, 77.120291E) of the locality. The harvests were not even started by the farmers in the study fields due to severe labor shortages. The extent of infestation, bird species involved, and feeding nature on the crop were recorded. The indigenous and other techniques

followed by the farmers to scare the birds were also noted. The extent of infestation was assessed based on regular and continuous field inspections and inquiries with the farmers for a period of two weeks. As the birds were very swift in flying and timid to even mild sounds, the nature of damage was studied by noting the infected panicles and fed capsules. Preference level of the mature and immature capsules and mode of attack were also recorded. For the purpose of species identification, bird photographs taken from the fields were matched with the slides and descriptions given in books (Juniper and Parr, 2010; Grimmett *et al*., 2014). Farmers feared the bird groups as migratory birds. But the authors suspected it was groups of Malabar parakeets, and to confirm the identity, the photographs were sent to experts involved in the bird biodiversity studies of the Western Ghats.

As per the field visits and the primary information collected from the farmers, nearly one hundred hectares of cardamom area was infested by the birds, and more than seventy-five farmers were affected. A similar type of infestation was also reported from another area (Udumbanchola) in Idukki district, Kerala, during subsequent periods. During the initial field inspection on the 11 September 2024, many of the shade trees in the infested area had three to five parakeets on the top, and the surrounding area was also filled with the call of birds. The bird has been causing damage to the economic part of the plant (capsule) by scooping the fruit surface (Fig. 1) with its beak and feeding on the internal content (Fig. 2). Fed capsules, along with their wastes, were scattered at the base of the cardamom clumps (Fig. 3). The birds prefer feeding on green and tender capsules to fully ripened capsules. The morphology of the avian species causing damage to the cardamom capsules (Fig. 4) matching with the morphology of the Malabar parakeet (Juniper and Parr, 2010; Grimmett *et al*., 2014).

As *P. columboides* mostly prefer an arboreal type of feeding habit, ground-level feeding and considerable damage to the cardamom capsules were unusual and unexpected. Crackers, beating drums, and making sounds of different predatory animals were practiced by the farmers to scare the birds. Rat (*Bandicota bengalensis* B.), squirrel (*Funambulus palmarum* L.), wild boar (*Sus scrofa* W.), and monkey (*Macaca radiata* L.) were considered the major vertebrate pest species that severely damage cardamom (Chakravarthy and Srihari, 2000). Even though some avian species were reported in cardamom as pests, this is the first record of a parrot species causing considerable damage to the cardamom crop in a large area.

The CHR system is highly fragile and unique in nature. Due to intensive monocrop farming, the complex tropical forest has been converted to a more open, simple, and uniform system (Murugan *et al*., 2009). A clear and drastic shift in the diversity and endemism of tree species can be easily seen in the CHR system (Pascal *et al*., 2004; Salish *et al*., 2015). Deliberate inclusion of preferred tree species and selective tree felling further drop down the diversity (Murugan *et al*., 2022; Nafeesa and Murugan, 2023). Excessive shade lopping reduced the natural regeneration, flowering, and fruit setting in the above-ground tree canopy. Even in August and September months, flowers and small fruits accessibility to arboreal animals were limited in the cardamom hotspots of the CHR area. Unavailability of natural and wild food sources in the infested area may be one of the reasons to trigger the acceptance of cardamom capsules as a new food option for Malabar parakeets. The upper canopy of severely lopped cardamom forest couldn't perform its minimum ecosystem functions (goods and services).

To reduce further damage, nonlethal scaring and botanical deterrence have been advocated to farmers as short-term options. But in this highly sensitive CHR system, understanding the actual root cause and long-term corrective measures in terms of its forest diversity and its roughness can only sustain the production system. As the species involved in this damage is an IUCN Red

Figs. 1 – 4. Infestation pattern of parakeet on cardamom (1, scoops on the fruit surface 2, Damaged capsules 3, Fed capsules at the base of the cardamom clumps 4, *P. columboides* feeding on cardamom)

Listed species as "Least Concern" and the crop is high value in nature, the adoptable measures should not cause any negative impact on the biodiversity as well as the endemic life of the bird species. Finally, we could see a considerable reduction in the parakeet population as well as other wildlife populations upon our follow-up visits. The reason for this reduction in animal biodiversity in the study site is not clear.

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