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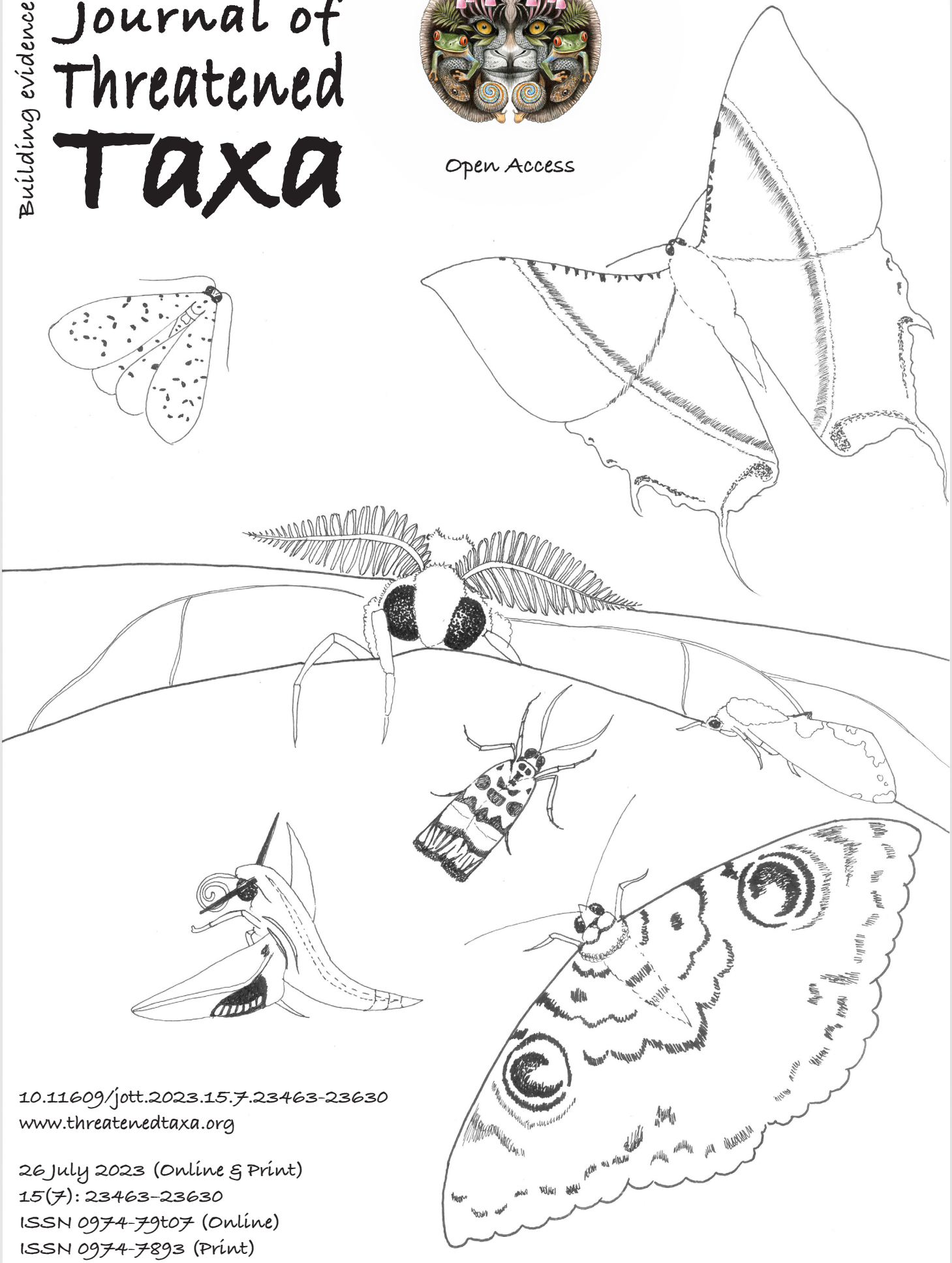

10.11609/jott.2023.15.7.23463-23630
www.threatenedtaxa.org

26 July 2023 (Online & Print)
15(7): 23463–23630
ISSN 0974-7907 (Online)
ISSN 0974-7893 (Print)

ISSN 0974-7907 (Online); ISSN 0974-7893 (Print)

Publisher
Wildlife Information Liaison Development Society
www.wild.zooreach.org

Host
Zoo Outreach Organization
www.zooreach.org

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Cover: Celebrating the unsung heroes—moths, our nocturnal pollinators. © Priyanka Iyer.

Journal of Threatened Taxa | www.threatenedtaxa.org | 26 July 2023 | 15(7): 23529–23544

ISSN 0974-7907 (Online) | ISSN 0974-7893 (Print)

https://doi.org/10.11609/jott.7520.15.7.23529-23544

#7520 | Received 13 June 2021 | Final received 19 June 2023 | Finally accepted 30 June 2023

OPEN ACCESS

COMMUNICATION

Birds of Kanetiya area - inventory, notable sightings, and overview of seasonal changes in reporting frequency of bird species in an unprotected area of Himachal Pradesh, India

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Abstract: Biodiversity of unprotected areas in the western Himalayan region is under threat. Despite this, it is poorly studied and documented. The citizen science platform eBird was used to record bird species of the unprotected Kanetiya area (Darbhog panchayat), Shimla, Himachal Pradesh from August 2019–2020. Reporting frequency using this data was calculated to represent an index of species abundance. This was calculated independently for each species across three seasons and reported as a metric that can be tracked over time. One-hundred-and-twenty-four (20% of the species from Himachal Pradesh) species of birds belonging to 13 orders and 43 families were recorded. Of these, 37 (30%) were recorded year-round and the remaining 87% (80%) were migratory. The checklist consisted of five species of high conservation concern and 22 species of moderate conservation concern. This checklist also provides insights into the distributions of some species whose ranges within India are not yet well defined (Northern Long-eared Owl *Asio otus*, Aberrant Bush Warbler *Horornis flavolivaceus*, Himalayan Owl *Strix nivicolum*) and into migration through this part of the Himalaya (Black Stork *Ciconia nigra*). Locals can be educated to upload short checklists for monitoring since they have helped the local forest department's conservation efforts.

Keywords: Abundance, checklist, eBird, reporting frequency, western Himalaya.

Editor: Rajiv S. Kalsi, M.L.N. College, Haryana, India.

Date of publication: 26 July 2023 (online & print)

Citation: Tiwari, S. (2023). Birds of Kanetiya area - inventory, notable sightings, and overview of seasonal changes in reporting frequency of bird species in an unprotected area of Himachal Pradesh, India. *Journal of Threatened Taxa* 15(7): 23529–23544. https://doi.org/10.11609/jott.7520.15.7.23529-23544

Funding: None.

Competing interests: The author declares no competing interests.

Author details: I started pursuing full-time research in conservation and ecology in 2018. I volunteered to provide the foundational work for the Urban Green Space Project at Forest Research Institute, Dehradun and worked briefly with the Black Kites Project, Wildlife Institute of India. In 2019, I joined the Cheer Pheasant Reintroduction Program under the Himachal Pradesh Forest Department, Shimla as a research assistant. Currently, I am not affiliated with any institute but continue to learn, read, and write about conservation.

Acknowledgments: I thank Ashwin Viswanathan for commenting on various drafts of the manuscript and suggesting the method for analyzing the data and reporting frequency. I also thank Sandhya Marathe and Monica Kaushik for commenting on early stages of the manuscript. I am grateful to residents, especially, Vikas Thakur, Sanjeev Kumar, Satish Thakur, Laikram Thakur, Mamta Thakur, and Dhiman for sharing their personal observations with me. I am grateful to Puja Sharma, Tim Inskipp, Rajah Jayapal, and staff of SACON and WII library for providing various reference materials used in the manuscript. I also thank the reviewers and the subject editor for their valuable suggestions and constructive criticism. For methodology, I also referred to https://www.slideshare.net/suhelq/neighbourhood-bird-monitoring-through-consistent-listing.

INTRODUCTION

Himachal Pradesh in the western Himalaya is home to several species of animals and plants. The protected area network of the state consists of five national parks, 26 wildlife sanctuaries, and three conservation reserves spread across 8,391 km^2 (Himachal Pradesh Forest Department 2022). Apart from this, several species are found in the unprotected region, which makes up more than 85% of the state. These include several endemic and threatened species like the Musk Deer *Moschus moschiferus*, Cheer Pheasant *Catreus wallichii*, and Himalayan Yew *Taxus wallichiana*. Although unprotected areas of the western Himalaya support biodiversity, they are threatened by deforestation, habitat alteration and habitat fragmentation caused by the construction of roads and trails (Pandit et al. 2007; Pandit & Kumar 2013). Habitats of such areas may change or degrade completely, leading to extinctions even before the documentation of their biodiversity is complete (González-Oreja 2008). Conversion of natural habitat can specifically lead to local extinctions of specialist species across various taxa (Korkeamäki & Suhonen 2002; Munday 2004). For example, the Vulnerable Cheer Pheasant became locally extinct in Jaunaji, Himachal Pradesh, after grasslands were converted into agricultural lands (Kaul 2014). Medicinal plants like the Elephant's Foot *Dioscorea deltoidea* and Himalayan Yew are threatened with extinction due to overexploitation (IUCN 2008). In private landholdings of rural areas, local communities often burn grasses and understories to increase the yield of grass in summer (Garson et al. 1992). This endangers native ground-dwelling birds and other fauna (Manupriya 2019).

Due to these concerns, scientists, conservation managers, and local communities must focus on monitoring and devising ways to conserve these habitats (Herremans 1998) and the species they support. This will require an inventory of taxa found in different regions (Llanos et al. 2011; Sharma et al. 2018) and an understanding of the effects of land use change on various floral and faunal communities.

Birds can be used as model taxa to understand the biodiversity health of an ecosystem (Eglington et al. 2012). This is because they play diverse roles in an ecosystem (e.g., pollinators, seed dispersers) (Garcia et al. 2010; Whelan et al. 2015) and have an intricate association with their environment. Subsequently, areas that support many birds of high conservation concern can be prioritized for conservation. Repeated surveys can also draw attention to the decline in functional diversity of bird species from an area. This can further highlight the degradation in ecosystem services like decomposition, pollination, and seed dispersal (Şekercioğlu et al. 2004).

An informative baseline checklist of the birds of the human-dominated Kanetiya area in Shimla, Himachal Pradesh is presented in this study. This landscape lies in Darbhog panchayat, Shimla Rural tehsil. It lies outside the protected area network and is shaped by various anthropogenic activities of the residents. Reporting frequency has been used to provide an index of the seasonal abundance of each species. This can be used as a baseline to assess the change in species composition with time.

MATERIALS AND METHODS

Study area

This study uses checklists submitted by the author [ST] while visiting Seri, Bagdra, Jalpan, Kool, and Undala villages and their surroundings. These villages lie within the Kanetiya region (Figure 1) named after the local deity Kanetiya Maharaj. The region comes under the jurisdiction of the Darbhog panchayat, Shimla rural tehsil.

The surveyed area spreads across 3.5 km^2. Its elevation ranges from c. 1,480–2,190 m, between 31.0340–31.0115 °N and 77.2764–77.3004 °E. A tributary of the river Yamuna flows through the lowest part of the sampled area. The landscape is highly fragmented and comprises plant communities either dominated by Banj Oak *Quercus leucotrichophora*, Deodar *Cedrus deodara*, or grasslands scattered with Chir Pine *Pinus roxburghii*. The area has a temperate climate and the temperature ranges from -9–31 °C. Snowfall occurs in the area almost every year, and in January 2020, it reached an eight-year high (Press Trust of India 2020). Residents used the area for fodder collection, resin, wood collection, cattle grazing and religious purposes. In June 2019, a forest patch of the area suffered from a fire that had spread to it from nearby grasslands.

The area lies 22 km from Chail Wildlife Sanctuary, 26 km from Churdhar Wildlife Sanctuary, and 8 km from Shimla Water Catchment Wildlife Sanctuary (Google Earth Pro 2020). Though it lies outside sanctuaries and national parks, the Himachal Pradesh Forest Department in cooperation from residents has reintroduced the Vulnerable Cheer Pheasant in grasslands between Seri and Undala villages (IUCN 2020b). The reintroduction site consists of a demarcated intensive management area that spreads across one square kilometer and consists of grasslands and demarcated protected forests.

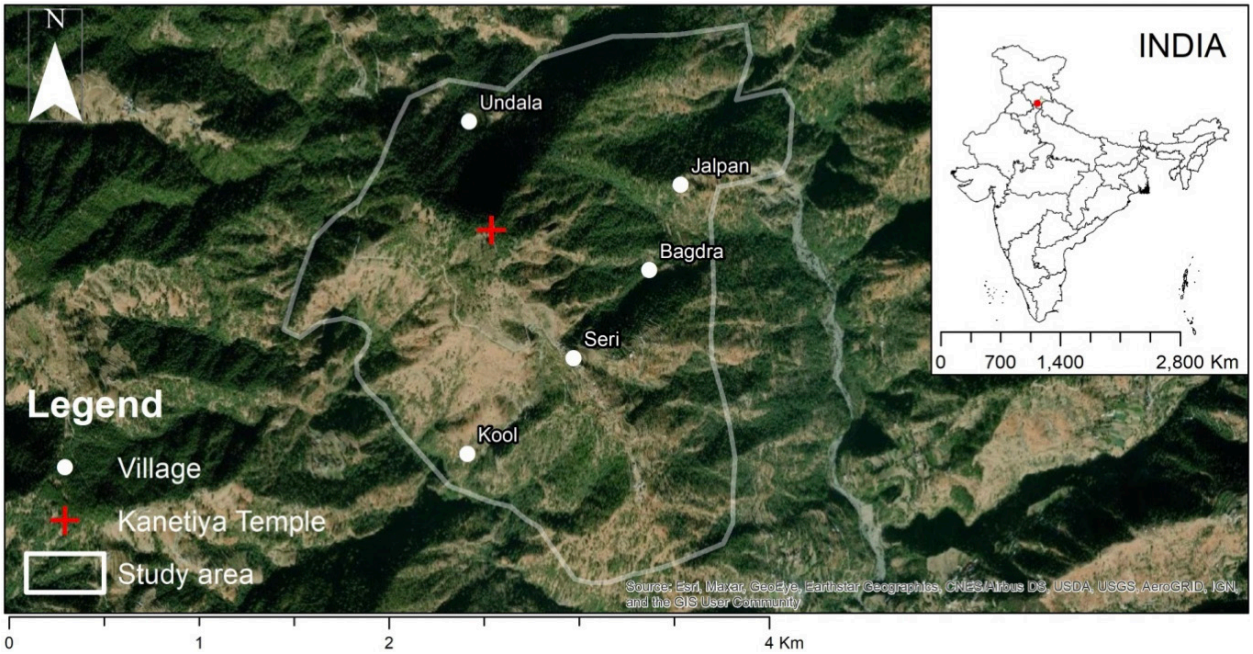

Figure 1. The region within the Kanetiya area, Shimla where birds were recorded from August 2019–2020.

Data collection

The bird checklists were uploaded using the eBird mobile app while visiting the region between August 2019 and August 2020. When all identified species were reported, the checklists were deemed complete; however, if some species were deliberately omitted, they were considered incomplete. Along with these details, the checklists included the date, starting time, duration, observation type (stationary/traveling) and track record. Species were recognized visually or by call, and checked with field guides (Grimmett et al. 2011; Rasmussen & Anderton 2012) and the Merlin picture identification app (The Cornell Laboratory 2020) for confirmation. Photographs and call recordings of unidentified species were shared with experts for identification.

Around 341 complete checklists from the eBird website were downloaded and combined with 11 complete checklists uploaded by other eBird users who visited the area during the study period. If a checklist had been shared with multiple observers, the version with the maximum number of species was chosen. In addition to the eBird collection, a local reported one species (Cattle Egret *Bulcus ibis*). A total of 212 checklists (60%) were less than an hour long, 107 checklists ranged in length from one to two hours and 24 checklists, each lasting between two and three hours. Two checklists were 4 to 5 hours long, while seven checklists ranged in length 3–4 hours. The checklists concerned the three seasons. These were the summer season (April through June; effort: 80 checklists), the monsoon season (July through September; effort: 37 checklists), and the winter season (October through March; effort: 235 checklists). The dataset included 100 stationary checklists (summer 22, monsoon 7, and winter 71) and 252 traveling checklists (summer 58, monsoon 29, and winter 165). Throughout the course of the research, 346.28 hours were put in (summer: 76.13; monsoon: 27.12; winter: 243.03), and 129.09 km were traveled (summer: 23.6; monsoon: 22.96; winter: 82.53).

Data analysis

Microsoft Excel 2007 was used to organize the data and calculate the reporting frequency of each species across different seasons. Reporting frequency is the percentage of checklists in which a species was recorded over a given period ((number of checklists a species was recorded during a season/number of total complete checklists reported during the season) X 100) (Viswanathan et al. 2020; eBird 2021c). Reporting frequency was calculated for each species separately for three seasons.

Species were classified as 'year-round' if they were reported across all three seasons, and 'seasonal' if they were detected only during certain seasons. India checklist v4.0 (Praveen et al. 2020) and IUCN Red List (IUCN 2020a) were used to refer to the taxonomy of species and their threat status, respectively. State of India's Birds Report (SoIB 2020a) was used to categorize birds as per their status of conservation concern. This report used short-

term and long-term population trends of species to categorize them as species of high, moderate, and low conservation concern.

RESULTS

One-hundred-and -twenty-four bird species belonging to 13 orders and 43 families were recorded. Of these, 37 were present year-round and 87 were seasonal. 74, 57, and 101 species were recorded in summer, monsoon, and winter, respectively.

Five species of high conservation concern (SoIB 2020a) were recorded during the study. All five had a low reporting frequency. These were Cheer Pheasant *Catreus wallichii* (summer-10, winter- 2.55), Red-headed Vulture *Sarcogyps calvus* (winter- 1.70), Short-toed Snake Eagle *Circaetus gallicus* (summer-1.25, winter- 6.38), Steppe Eagle *Aquila nipalensis* (monsoon-2.70, winter- 11.06), and White-rumped Vulture *Gyps bengalensis* (winter-0.85). None of these were record in all three seasons.

About 22 species of moderate conservation concern were identified (SoIB 2020a). In all three seasons (summer, monsoon, and winter), the Himalayan Griffon *Gyps himalayensis* had the highest reported frequency. In the summer and monsoon seasons, the Upland Pipit *Anthus sylvanus* was seen to report a frequency of 52.5 and 32.43, respectively. Other species of moderate conservation concern included the Grey-headed Canary-flycatcher *Culicicapa ceylonensis*, Long-tailed Minivet *Pericrocotus ethologus*, Lemon-rumped Warbler *Phylloscopus chloronotus*, and Common Kestrel *Falco tinnunculus*, all of which had very low reporting frequencies in all three seasons (<10) (Table 1).

Of the remaining 97 species, 89 were of low conservation concern and eight had not been categorized.

The most frequently observed species during the summer were Striated Prinia *Prinia crinigera* (68.75), Himalayan Bulbul *Pycnonotus leucogenis* (67.5), Great Barbet *Psilopogon virens* (66.25), Large-billed Crow *Corvus macrorhynchos* (65), Blue-throated Barbet *Psilopogon asiaticus* (52.5) and Upland Pipit *Anthus sylvanus* (52.5) (Figure 2). Of these, the Blue-throated Barbet *Psilopogon asiaticus* and Upland Pipit *Anthus sylvanus* were designated as seasonal. In the monsoon season, Himalayan Bulbul *Pycnonotus leucogenis* (78.38), Great Barbet *Psilopogon virens* (43.24), Striated Prinia *Prinia crinigera* (40.54), Large-billed Crow *Corvus macrorhynchos* (40.54), Black Francolin *Francolinus francolinus* (40.54) and Upland Pipit *Anthus sylvanus* (32.43) were reported most frequently. All of the species that were most frequently reported during the winter were recorded all year round. These include the Large-billed Crow *Corvus macrorhynchos* (71.06), Himalayan Bulbul *Pycnonotus leucogenis* (61.28), Himalayan Griffon *Gyps himalayensis* (50.64), Blue Whistling Thrush *Myophonus caeruleus* (33.19), Grey-hooded Warbler *Phylloscopus xanthoschistos* (29.36), and Great Barbet *Psilopogon virens* (27.23).

Thirty-seven species were recorded in all three seasons and classified as year-round or resident. These included species of moderate conservation concern like the Himalayan Griffon *Gyps himalayensis* (summer- 37.5, monsoon-27.03, winter- 50.64), Common Kestrel *Falco tinnunculus* (summer- 6.25, monsoon- 5.41, winter- 5.53), Long-tailed Minivet *Pericrocotus ethologus* (summer- 2.5, monsoon- 2.70, winter- 2.13), Lemon-rumped Warbler *Phylloscopus chloronotus* (summer- 2.5, monsoon-2.70, winter- 2.98), and Grey-headed Canary-flycatcher *Culicicapa ceylonensis* (summer- 1.25, monsoon- 2.70, winter- 0.43).

Of the year-round species, 17 had the highest reporting frequency during summer (Figure 2A), 12 during the monsoon (Figure 2B) and eight during the winter season (Figure 2C).

Thirteen species were exclusively recorded during the summer. Three of these, Black Stork *Ciconia nigra* (an incidental record), Plumbeous Water Redstart *Phoenicurus fuliginosus* (an incidental record) and Himalayan Cuckoo *Cuculus saturates* (11.25) were of moderate conservation concern. Of the species recorded exclusively during the monsoon, three, namely Asian Brown Flycatcher *Muscicapa dauurica* (2.7) and Black Redstart *Phoenicurus ochruros* (5.41) were of moderate conservation concern and the Chestnut-bellied Rock Thrush *Monticola rufiventris* (2.70) was of low conservation concern 37 species were recorded exclusively during the winter. Among these, raptors like the Red-headed Vulture *Sarcogyps calvus* (1.70) and White-rumped Vulture *Gyps bengalensis* (0.85) were of high conservation concern. A few species of moderate conservation concern like Koklass Pheasant *Pucrasia macrosomia* (0.43), Golden Eagle *Aquila chrysaetos* (0.85), Long-tailed Shrike *Lanius schach* (1.70), Altai Accentor *Prunella himalayana* (0.43), Black-throated Accentor *Prunella atrogularis* (2.13), Himalayan White-browed Rosefinch *Carpodacus thura* (0.43), and White-capped Bunting *Emberiza stewarti* (0.43) were exclusively recorded during this season.

Significant sightings

The following records are significant as they provide

Table 1. Checklist of bird species recorded in the Kanetiya region (3.5 km²) from August 2019–2020 along with the IUCN category (IUCN 2020a), category of conservation concern (SoIB 2020a) and reporting frequency across seasons.

	Common name	Scientific name	IUCN Red List status	Status of conservation concern	Summer (April–June) (80 checklists)	Monsoon (July–September) (36 checklists)	Winter (October–March) (235 checklists)	Migratory status
1	Indian Peafowl	*Pavo cristatus*	LC	L	3.75	0	1.28	S
2	Black Francolin	*Francolinus francolinus*	LC	L	47.5	40.54	15.74	YR
3	Red Junglefowl	*Gallus gallus*	LC	L	7.5	2.70	0	S
4	Cheer Pheasant	*Catreus wallichii*	VU	H	10	0	2.55	S
5	Kalij Pheasant	*Lophura leucomelanos*	LC	L	27.5	13.51	12.34	YR
6	Koklass Pheasant	*Pucrasia macrolopha*	LC	M	0	0	0.43	S
7	Rock Pigeon	*Columba livia*	LC	L	2.5	2.70	0.85	YR
8	Oriental Turtle Dove	*Streptopelia orientalis*	LC	L	17.5	10.81	0.85	YR
9	Wedge-tailed Green Pigeon	*Treron sphenurus*	LC	L	6.25	0	0	S
10	Himalayan Cuckoo	*Cuculus saturatus*	LC	M	11.25	0	0	S
11	Common Cuckoo	*Cuculus canorus*	LC	M	35	2.70	0	S
12	Grey Nightjar	*Caprimulgus jotaka*	LC	ND	15	0	0	S
13	Black Stork	*Ciconia nigra*	LC	M	I*	0	0	S
14	Cattle Egret	*Bubulcus ibis*	LC	L	0	0	I*	S
15	Bearded Vulture	*Gypaetus barbatus*	NT	M	1.25	0	2.55	S
16	Oriental Honey Buzzard	*Pernis ptilorhynchus*	LC	L	I*	0	0	S
17	Red-headed Vulture	*Sarcogyps calvus*	CR	H	0	0	1.70	S
18	White-rumped Vulture	*Gyps bengalensis*	CR	H	0	0	0.85	S
19	Himalayan Griffon	*Gyps himalayensis*	NT	M	37.5	27.03	50.64	YR
20	Short-toed Snake Eagle	*Circaetus gallicus*	LC	H	1.25	0	6.38	S
21	Mountain Hawk Eagle	*Nisaetus nipalensis*	LC	L	I*	0	I*	S
22	Booted Eagle	*Hieraaetus pennatus*	LC	L	1.25	0	0	S
23	Steppe Eagle	*Aquila nipalensis*	EN	H	0	2.70	11.06	S
24	Golden Eagle	*Aquila chrysaetos*	LC	M	0	0	0.85	S
25	Bonelli's Eagle	*Aquila fasciata*	LC	L	1.25	0	2.98	S
26	Hen Harrier	*Circus cyaneus*	LC	ND	3.75	0	2.55	S
27	Shikra	*Accipiter badius*	LC	L	0	2.70	2.13	S
28	Mountain Scops Owl	*Otus spilocephalus*	LC	ND	6.25	0	4.68	S
29	Collared Owlet	*Glaucidium brodiei*	LC	L	0	0	0.43	S
30	Asian Barred Owlet	*Glaucidium cuculoides*	LC	L	0	0	2.98	S
31	Himalayan Owl	*Strix nivicolum*	LC	ND	I*	0	0	S
32	Northern Long-eared Owl	*Asio otus*	LC	ND	0	0	2.55	S
33	Common Hoopoe	*Upupa epops*	LC	M	3.75	2.70	0	S
34	Great Barbet	*Psilopogon virens*	LC	L	66.25	43.24	27.23	YR
35	Blue-throated Barbet	*Psilopogon asiaticus*	LC	L	52.5	13.51	0	S
36	Speckled Piculet	*Picumnus innominatus*	LC	L	0	0	1.28	S
37	Brown-fronted Woodpecker	*Dendrocoptes auriceps*	LC	L	2.5	2.70	9.36	YR
38	Fulvous-breasted Woodpecker	*Dendrocopos macei*	LC	L	0	2.70	2.13	S
39	Himalayan Woodpecker	*Dendrocopos himalayensis*	LC	L	0	2.70	2.13	S
40	Lesser Yellownape	*Picus chlorolophus*	LC	L	2.5	0	0	S
41	Scaly-bellied Woodpecker	*Picus squamatus*	LC	L	28.75	27.03	19.15	YR
42	Grey-headed Woodpecker	*Picus canus*	LC	L	0	8.11	2.55	S

	Common name	Scientific name	IUCN Red List status	Status of conservation concern	Summer (April–June) (80 checklists)	Monsoon (July–September) (36 checklists)	Winter (October–March) (235 checklists)	Migratory status
43	Common Kestrel	*Falco tinnunculus*	LC	M	6.25	5.41	5.53	YR
44	Eurasian Hobby	*Falco subbuteo*	LC	L	0	0	0.43	S
45	Peregrine Falcon	*Falco peregrinus*	LC	L	0	0	0.85	S
46	Slaty-headed Parakeet	*Psittacula himalayana*	LC	L	43.75	13.51	12.34	YR
47	Long-tailed Minivet	*Pericrocotus ethologus*	LC	M	2.5	2.70	2.13	YR
48	White-browed Shrike-babbler	*Pteruthius aeralatus*	LC	ND	1.25	0	1.28	S
49	White-throated Fantail	*Rhipidura albicollis*	LC	L	0	0	2.13	S
50	Black Drongo	*Dicrurus macrocercus*	LC	L	5	8.12	1.28	YR
51	Ashy Drongo	*Dicrurus leucophaeus*	LC	L	1.25	0	0	S
52	Long-tailed Shrike	*Lanius schach*	LC	M	0	0	1.70	S
53	Eurasian Jay	*Garrulus glandarius*	LC	L	0	0	0.43	S
54	Black-headed Jay	*Garrulus lanceolatus*	LC	L	10	5.41	5.96	YR
55	Yellow-billed Blue Magpie	*Urocissa flavirostris*	LC	L	0	0	0.85	S
56	Red-billed Blue Magpie	*Urocissa erythroryncha*	LC	L	5	8.11	3.83	YR
57	Grey Treepie	*Dendrocitta formosae*	LC	L	13.75	27.03	17.02	YR
58	Spotted Nutcracker	*Nucifraga caryocatactes*	LC	ND	10	29.73	0	S
59	Large-billed Crow	*Corvus macrorhynchos*	LC	L	65	40.54	71.06	YR
60	Yellow-bellied Fantail	*Chelidorhynx hypoxanthus*	LC	L	0	0	0.43	S
61	Grey-headed Canary-flycatcher	*Culicicapa ceylonensis*	LC	M	1.25	2.70	0.43	YR
62	Coal Tit	*Periparus ater*	LC	L	0	0	1.70	S
63	Green-backed Tit	*Parus monticolus*	LC	L	5	10.81	11.91	YR
64	Cinereous Tit	*Parus cinereus*	LC	L	7.5	16.22	10.64	YR
65	Himalayan Black-lored Tit	*Machlolophus xanthogenys*	LC	L	2.5	8.11	4.26	YR
66	Striated Prinia	*Prinia crinigera*	LC	L	68.75	40.54	5.11	YR
67	Dusky Crag Martin	*Ptyonoprogne concolor*	LC	L	2.5	0	0	S
68	Red-rumped Swallow	*Cecropis daurica*	LC	L	10	5.41	1.70	YR
69	Himalayan Bulbul	*Pycnonotus leucogenis*	LC	L	67.5	78.38	61.28	YR
70	Black Bulbul	*Hypsipetes leucocephalus*	LC	L	3.75	16.23	1.70	YR
71	Buff-barred Warbler	*Phylloscopus pulcher*	LC	L	0	0	0.43	S
72	Hume's Warbler	*Phylloscopus humei*	LC	L	0	0	0.85	S
73	Lemon-rumped Warbler	*Phylloscopus chloronotus*	LC	M	2.5	2.70	2.98	YR
74	Common Chiffchaff	*Phylloscopus collybita*	LC	L	0	0	0.43	S
75	Grey-hooded Warbler	*Phylloscopus xanthoschistos*	LC	L	47.5	27.03	29.36	YR
76	Brownish-flanked Bush Warbler	*Horornis fortipes*	LC	L	6.25	5.41	0.851	YR
77	Aberrant Bush Warbler	*Horornis flavolivaceus*	LC	L	0	0	0.43	S
78	Black-throated Tit	*Aegithalos concinnus*	LC	L	13.75	5.41	16.17	YR
79	Whiskered Yuhina	*Yuhina flavicollis*	LC	L	0	0	0.43	S
80	Indian White-eye	*Zosterops palpebrosus*	LC	L	12.5	21.62	3.83	YR
81	Black-chinned Babbler	*Cyanoderma pyrrhops*	LC	L	0	8.11	1.28	S
82	Rusty-cheeked Scimitar Babbler	*Erythrogenys erythrogenys*	LC	L	32.5	29.73	13.62	YR
83	Jungle Babbler	*Argya striata*	LC	L	0	0	0.85	S
84	White-throated Laughingthrush	*Pterorhinus albogularis*	LC	L	0	0	I*	S
85	Rufous-chinned Laughingthrush	*Ianthocincla rufogularis*	LC	L	0	0	0.43	S

	Common name	Scientific name	IUCN Red List status	Status of conservation concern	Summer (April–June) (80 checklists)	Monsoon (July–September) (36 checklists)	Winter (October–March) (235 checklists)	Migratory status
86	Streaked Laughingthrush	*Trochalopteron lineatum*	LC	L	26.25	13.51	20	YR
87	Variegated Laughingthrush	*Trochalopteron variegatum*	LC	L	3.75	0	8.94	S
88	Rufous Sibia	*Heterophasia capistrata*	LC	L	0	2.70	8.09	S
89	Chestnut-tailed Minla	*Actinodura strigula*	LC	L	1.25	0	1.28	S
90	Wallcreeper	*Tichodroma muraria*	LC	L	0	0	0.43	S
91	Chestnut-bellied Nuthatch	*Sitta cinnamoventris*	LC	L	2.5	0	0	S
92	Bar-tailed Treecreeper	*Certhia himalayana*	LC	L	1.25	0	2.98	S
93	Common Myna	*Acridotheres tristis*	LC	L	0	2.70	2.98	S
94	Grey-winged Blackbird	*Turdus boulboul*	LC	L	2.5	2.70	0.43	YR
95	Black-throated Thrush	*Turdus atrogularis*	LC	ND	2.5	0	2.98	S
96	Asian Brown Flycatcher	*Muscicapa dauurica*	LC	M	0	2.7	0	S
97	Verditer Flycatcher	*Eumyias thalassinus*	LC	L	20	5.41	3.83	YR
98	Blue Whistling Thrush	*Myophonus caeruleus*	LC	L	23.75	24.32	33.19	YR
99	Himalayan Bush Robin	*Tarsiger rufilatus*	LC	L	0	0	1.28	S
100	Ultramarine Flycatcher	*Ficedula superciliaris*	LC	L	0	0	0.85	S
101	Plumbeous Water Redstart	*Phoenicurus fuliginosus*	LC	M	I*	0	0	S
102	Blue-capped Redstart	*Phoenicurus coeruleocephala*	LC	L	0	2.70	20.43	S
103	Black Redstart	*Phoenicurus ochruros*	LC	M	0	5.41	0	S
104	Chestnut-bellied Rock Thrush	*Monticola rufiventris*	LC	L	0	2.70	0	S
105	Blue-capped Rock Thrush	*Monticola cinclorhyncha*	LC	L	8.75	5.41	0	S
106	Siberian Stonechat	*Saxicola maurus*	LC	L	20	13.51	1.70	YR
107	Grey Bushchat	*Saxicola ferreus*	LC	L	16.25	5.41	7.66	YR
108	Purple Sunbird	*Cinnyris asiaticus*	LC	L	0	0	0.43	S
109	Scaly-breasted Munia	*Lonchura punctulata*	LC	L	0	0	0.85	S
110	Altai Accentor	*Prunella himalayana*	LC	M	0	0	0.43	S
111	Rufous-breasted Accentor	*Prunella strophiata*	LC	L	1.25	0	1.70	S
112	Black-throated Accentor	*Prunella atrogularis*	LC	M	0	0	2.13	S
113	House Sparrow	*Passer domesticus*	LC	L	16.25	10.81	17.45	YR
114	Russet Sparrow	*Passer cinnamomeus*	LC	L	8.75	0	5.96	S
115	Upland Pipit	*Anthus sylvanus*	LC	M	52.5	32.43	0	S
116	Tree Pipit	*Anthus trivialis*	LC	L	0	0	0.43	S
117	Common Rosefinch	*Carpodacus erythrinus*	LC	L	6.25	0	0	S
118	Pink-browed Rosefinch	*Carpodacus rodochroa*	LC	L	0	0	1.703	S
119	Himalayan white-browed rosefinch	*Carpodacus thura*	LC	M	0	0	0.43	S
120	Plain Mountain Finch	*Leucosticte nemoricola*	LC	L	0	0	3.83	S
121	Yellow-breasted Greenfinch	*Chloris spinoides*	LC	M	0	2.70	2.13	S
122	Fire-fronted Serin	*Serinus pusillus*	LC	L	2.5	0	5.53	S
123	Rock Bunting	*Emberiza cia*	LC	L	1.25	0	19.15	S
124	White-capped Bunting	*Emberiza stewarti*	LC	M	0	0	0.43	S

* Incidental Record(s)
LC—Least Concern | EN—Endangered | NT—Near Threatened | VU—Vulnerable | CR—Critically Endangered.
H—High | M—Moderate | L—Low | ND—Not Determined.
S—Seasonal | YR—Year-round.

information about the species which have been recently split like the Himalayan Owl *Strix nivicolum* (Dixit et al. 2016). It also contains species that have patchy distributions across India (for e.g., Northern Long-eared Owl *Asio otus*) (König & Weick 2010; Grimmett et al. 2011) or western Himalaya (e.g., Cheer Pheasant *Catreus wallichii*, Black Stork *Ciconia nigra*, and Rufous-chinned Laughingthrush *Garrulax rufogularis*). The Red-headed Vulture *Sarcogyps calvus* (BirdLife International 2022) and Koklas Pheasant *Pucrasia macrolopha* (BirdLife International 2016) are two records that additionally include information about the species' upper and lower elevation limits, respectively.

Cheer Pheasant *Catreus wallichii* (Image 1A): Other bird watchers and the author recorded wild individuals 16 times (distinguish from reintroduced individuals based on leg bands) using eBird (eBird 2022b). Sanjeev Kumar (a resident) also photographed three individuals on 30 December 2019. The highest count of birds was 12, recorded on 23 December 2019 (Tiwari 2019e). The absence of this species during monsoon may be either due to local migration of the species from the area or because Cheer Pheasants are less vocally active outside the breeding season (Gaston 1980). This grassland bird is found where areas are disturbed naturally or anthropogenically (Kaul et al. 2022). Cattle grazing and grassland burning in the area help maintain the habitat which supports this species.

Koklass Pheasant *Pucrasia macrolopha*: On 10 December 2019, Thakur (2019) observed a male Koklass Pheasant *Pucrasia macrolopha* about 100 m from the Kanetiya Temple (height c. 2,200 m). According to BirdLife International (2016), this is not far from the species' lowest elevation range. Locals have regularly reported seeing it at an elevation of 300 m higher, suggesting that it may have locally relocated to this area.

Black Stork *Ciconia nigra* (Image 1B) was recorded on 15 May 2020 (Tiwari 2020e). It has isolated records in Himachal Pradesh (Grimmett et al. 2011). After 20 minutes of circling the area, it flew eastward, perhaps on its way back to its breeding grounds.

Cattle Egret *Bubulcus ibis* (Image 1C): Mamta Thakur (resident) recorded one individual in the second week of January 2020. In this study, this species was identified by its yellow beak and differentiated from the Intermediate egret *Ardea intermedia* by its compact body. Though the species has few records from Shimla district (eBird 2022a) and is a resident in altitudinally lower areas of other districts (for e.g., Kangra, Una, Hamirpur, Sirmaur) (Grimmett et al. 2011) this is the only record of the species from the Kanetiya area.

Red-headed Vulture *Sarcogyps calvus* (Image 1F): During the winter, this species was seen flying over the forest located at an altitude of c. 2,000 m on four occasions (01 December 2019 (Tiwari 2019c), 14 December 2019 (Tiwari 2019d), 10 March 2020 (Tiwari 2020a) and 14 February 2020 (Thakur 2020)). This is close to the upper elevation limit of the bird (BirdLife International 2022).

Himalayan Owl *Strix nivicolum*: The species was heard in Seri Village from a *Pistacia integerrima* tree on 4 May 2020 (Tiwari 2020c) and 7 May 2020 (Tiwari 2020d). The distribution of this species is not very well known as it has recently been split from the Tawny Owl *Strix alco* (Dixit et al. 2016).

Northern Long-eared Owls *Asio otus* (Image 2D): Locals and the author recorded 1–4 individuals eight times in the grasslands near Seri village from 4–21 February 2020 (Tiwari & Kumar 2020). The species has erratic records from India (König & Weick 2010; Grimmett et al. 2011) and has only 25 records from the western Himalayan region (Tiwari & Kumar 2020).

Aberrant Bush Warbler *Horornis flavolivaceus*: Sharma (2020) reported the species on 20 February 2020 from the study area. BirdLife International (2017) record its occurrence to the eastern boundary of Himachal Pradesh and Grimmett et al. (2011) do not include Himachal Pradesh in the range of the species. Nevertheless, the species has records from Himachal Pradesh on eBird (eBird 2021a). It has records throughout the Himalayan region, the westernmost from Jammu & Kashmir (year 2019).

Rufous-chinned Laughingthrush *Garrulax rufogularis* (Image 3F): On 30 November 2019 (Tiwari 2019b), four individuals were found in bushes near the foot of a cliff that overhung a piece of grassland at a height of around 1,900 m. On the eBird platform (eBird 2022c), this is the species' fourth report from the Shimla District. The species is widespread in the eastern hills of India and the Himalaya, but its distribution in the western Himalaya is patchy (Grimmett et al. 2011). In Himachal Pradesh, there are more than 100 records, however, they are only found in Kangra (on the state's western border) and the territories around Shimla District (on the state's eastern border).

Wallcreeper *Tichodroma muraria* (Image 3G): One individual was recorded foraging on a rock surface along the road near Seri Village on 23 October 2019 (Tiwari 2019a). This species is found at high altitudes in the Himalaya (c. 3,300–5,000 m) throughout the year but is known to move towards lower elevations (up to c. 600m (eBird 2022e)) during the winter (Kirwan et al. 2020). Therefore, it could have been moving towards lower

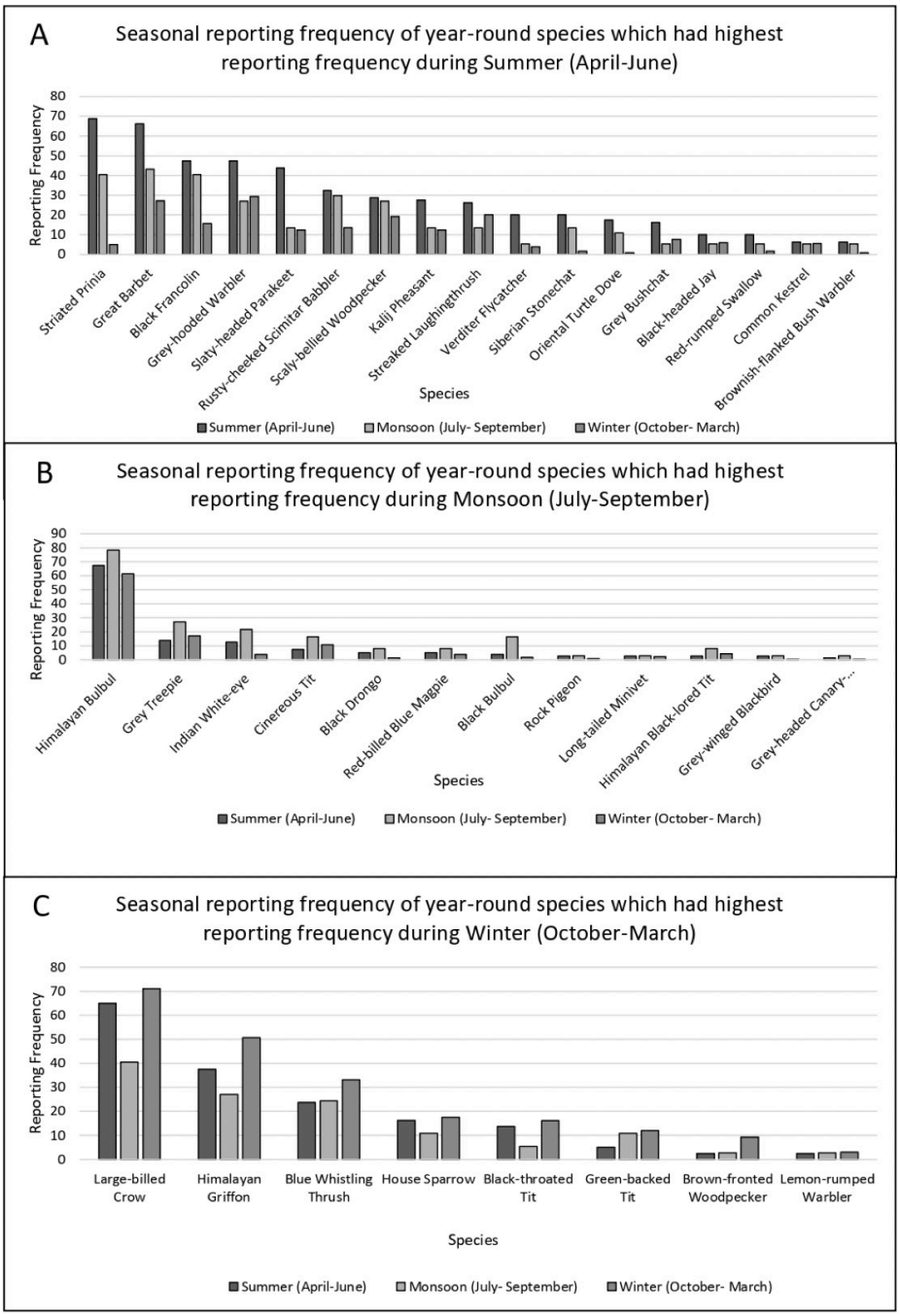

Figure 2. Seasonal reporting frequency of year-round species which had the highest reporting frequency during: A—Summer (April–June) | B—Monsoon (July–September) | C—Winter (October–March).

elevations at the onset of winter in the higher Himalayan region.

Tree Pipit *Anthus trivialis* (Image 3G): Three individuals were recorded in the fields of Seri village (c. 1,850 m) on 20 March 2020 (Tiwari 2020b). This species is a long-distant migrant. It winters (non-breeding season) in peninsular India and migrates to the trans-Himalayas, parts of Europe and North and Central Asia from mid-March to early May (SoIB 2020b; Tyler 2020). Therefore, these individuals could have been moving towards their breeding grounds.

Table 1 presents a comprehensive checklist of bird species recorded in August 2019–2020 along with the IUCN category (IUCN 2020a), category of conservation concern (SoIB 2020a) and reporting frequency across seasons of each species.

DISCUSSION

The environment of the Kanetiya region is shaped by local practices such as grassland burning, cattle grazing, and resource collection. The effects of human activities on bird diversity in the Himalayan terrain can be understood by comparing it to surrounding protected areas. The locals often voluntarily mitigate fires that occur in forest patches. Furthermore, locals protect small swathes of forest known as Devta ka Jungle (sacred groves), which are devoted to regional deities. Customary laws protect these areas from exploitation and destruction Bisht & Ghildiyal 2007; Salick et al. 2007; Anthwal et al. 2010; Singh et al. 2019). These customary laws apply to the forest next to the Kanetiya temple as well, and the land is protected by the locals.

The Cheer Pheasant Reintroduction Programme has been in progress since November 2019 in the designated protected forests and private grasslands close to Seri and Undala villages (IUCN 2020b). The local forest department's conservation program has received backing from the community, which has also taken part. The department could implement additional strategies that involve locals to promote conservation. This may include preparing them to submit simple bird checklists to eBird for monitoring.

Using the citizen science platform eBird, a list of 124 species was created across 3.5 km^2 with 39% of the species recorded from Shimla (eBird 2022d) and 20% of the species from Himachal Pradesh. This variety is brought about by the availability of several habitat types (Somveille et al. 2013; Dixit et al. 2016), elevation fluctuations, and unusual climatic conditions regarding temperature and moisture (Graham et al. 2014). Due to fewer visits to particular environments, some species may have been overlooked because of the non-systematic observations used to create this checklist.

This area is a breeding ground not only for the 37-year-round resident species but also for birds recorded only during the summer. These include Grey Nightjar *Caprimulgus jotaka*, Himalayan Cuckoo *Cuculus saturates*, Wedge-tailed Green Pigeon *Treron sphenurus*, Common Rosefinch *Carpodacus erythrinus*, Lesser Yellownape *Picus chlorolophus*, Dusky Crag Martin *Ptyonoprogne concolor*, Chestnut-bellied Nuthatch *Sitta cinnamoventris*, Booted Eagle *Hieraaetus pennatus* and Ashy Drongo *Dicrurus leucophaeus*. Additionally, birds like Black Stork *Ciconia nigra*, Oriental Honey Buzzard *Pernis ptilorhynchus*, Northern Long-eared Owl *Asio otus* and Tree Pipit *Anthus trivialis* might be using the area as a passage to their breeding grounds as they have incidental records during the summer season.

This area might be serving as a passage to the wintering grounds for some species which were recorded at either a very low reporting frequency or only once at the onset of winter. These include Red-headed Vulture *Sarcogyps calvus*, White-rumped Vulture *Gyps bengalensis*, Aberrant Bush Warbler *Horornis flavolivaceus* and Wallcreeper *Tichodroma muraria*.

Despite recording a high number of birds, some species that are recorded from nearby areas couldn't be recorded during the study period. These include the Green Bee-eater *Merops orientalis*, Blue-tailed Bee-eater *Merops philippinus*, Spot-winged Grosbeak *Mycerobas melanozanthos*, Black-and-yellow Grosbeak *Mycerobas icterioides*, Lesser Cuckoo *Cuculus poliocephalus*, Large Hawk Cuckoo *Hierococcyx sparverioides* and Asian Koel *Eudynamys scolopaceus* (eBird 2022d). While the Purple Sunbird *Cinnyris asiaticus* was recorded during the summer other sunbirds and flowerpeckers couldn't be recorded in any season. I also did not record the Black Kite *Milvus migrans*, which is frequently reported from the Shimla district (eBird 2021b). As per local testimony, the Chukar Partridge *Alectoris chukar* used to occur in the area but became locally extinct 10–15 years ago. Residents had also identified Indian Paradise Flycatcher *Terpsiphone paradise* in previous years, but it was not recorded during the study.

Some species were recorded only near the village houses. These include the Rock Pigeon *Columba livia* which was recorded across all three seasons at very low frequencies (Summer- 2.5, monsoon- 2.70, winter- 0.85) and House Sparrow *Passer domesticus* which was recorded at slightly higher frequencies across seasons (summer- 16.25, monsoon- 10.81, winter- 17.45). The Common Myna *Acridotheres tristis* was also recorded exclusively near village houses in the monsoon (2.70) and winter (2.98).

Most species recorded across all three seasons were rare (recorded with a low reporting frequency) (Figure 3). This pattern is seen in many other studies conducted across various ecosystems (Brown 1984).

Though such non-systematically collected information is valuable (Barnes et al. 2015), the scope of studies based on opportunistic observations can be limited (Snäll et al. 2011; Bird et al. 2014; Henckel et al. 2020). Reporting frequency is a function of abundance and detectability of a species (SoIB 2020a), but as detectability of a species varies among observers with different abilities for different species, it cannot be used to assess the change in population sizes of birds. Therefore, this study only provides a baseline index of abundance across seasons.

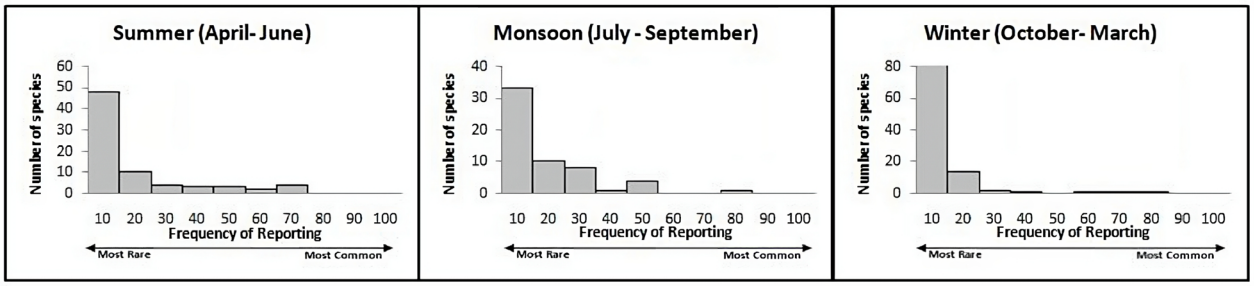

Figure 3. Number of rare (recorded with a low reporting frequency) and common (recorded with a high reporting frequency) bird species recorded across seasons.

A more systematic study based on consistent sampling protocol and effort can provide better information on the change in population of different species and can also be used to confirm true absences accurately (Thompson 2002).

A bird monitoring scheme focusing on unprotected areas can be developed by training bird watchers across the Himalaya to consistently record birds. This will require a simple and yet strict sampling design. Bird Count India (2021) is executing a similar effort at the national level as the Patch Monitoring Project. Such systemic surveys based on community participation can be more widespread and less resource-intensive (Neate-Clegg et al. 2020). They will also help create awareness and aid in conservation.

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Image 1. Photographic records of some species from the Kanetiya Area: A—Cheer Pheasant *Catreus wallichii* | B—Black Stork *Ciconia nigra* | C—Cattle egret *Bubulcus ibis* | D—Bearded Vulture *Gypaetus barbatus* | E—Oriental Honey Buzzard *Pernis ptilorhynchus* | F—Red-headed Vulture *Gypaetus barbatus* | G—Short-toed Snake Eagle *Circaetus gallicus* | H—Mountain Hawk Eagle *Nisaetus nipalensis*. © A—Sanjeev Kumar | C—Mamta Thakur | Others—Samakshi Tiwari.

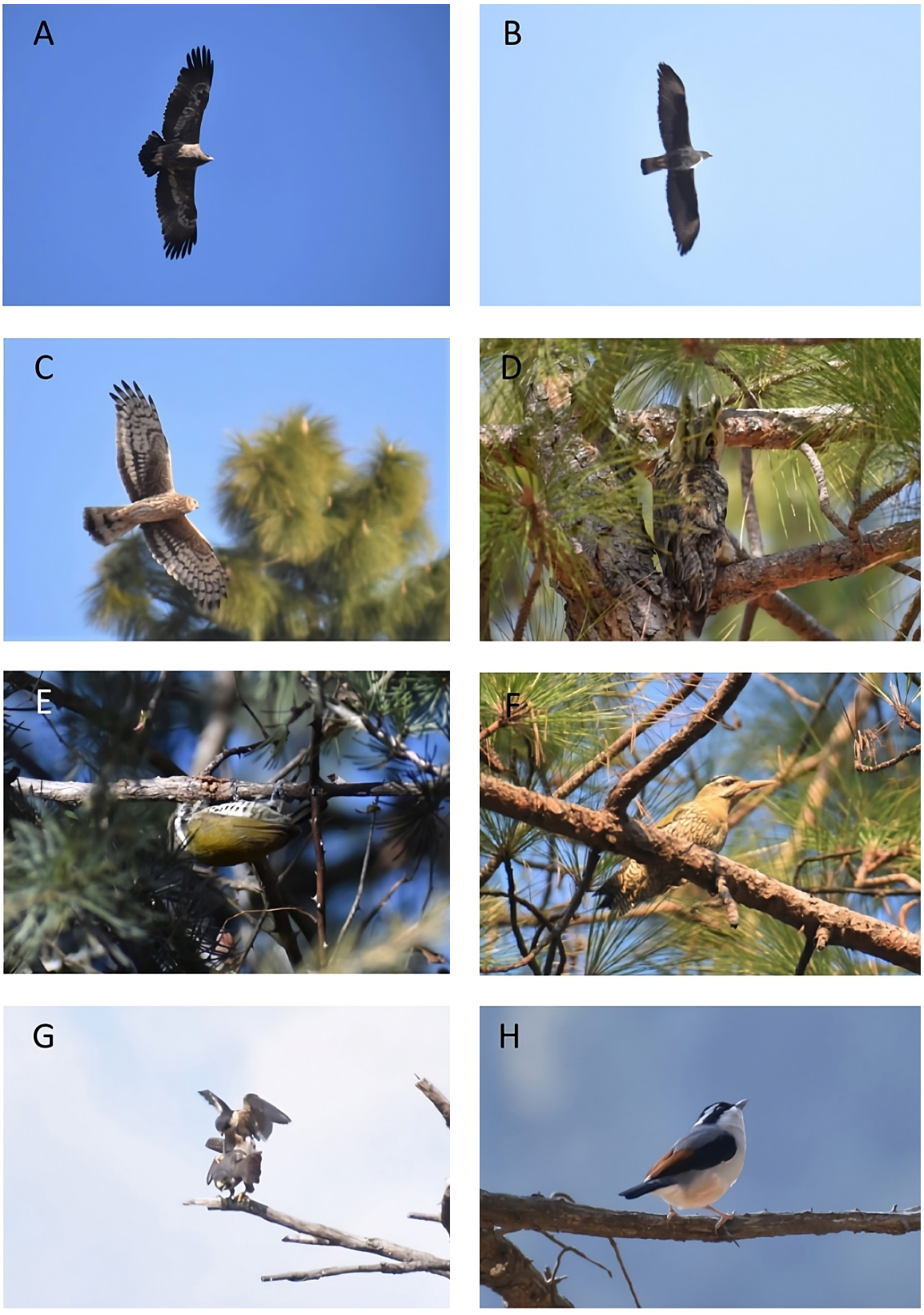

Image 2. Photographic records of some species from the Kanetiya Area: A—Steppe Eagle *Aquila nipalensis* | B—Bonelli's Eagle *Aquila fasciata* | C—Hen Harrier *Circus cyaneus* | D—Northern Long-eared Owl *Asio otus* | E—Speckled Piculet *Picumnus innominatus* | F—Scaly-bellied Woodpecker *Picus squamatus* | G—Eurasian Hobby *Falco subbuteo* | H—White-browed Shrike-babbler *Pteruthius aeralatus*. © Samakshi Tiwari.

Image 3. Photographic records of some species from the Kanetiya Area: A—Long-tailed Shrike *Lanius schach* | B—Red-billed Blue Magpie *Urocissa erythroryncha* | C—Spotted Nutcracker *Nucifraga caryocatactes* | D—Coal Tit *Periparus ater* | E—Lemon-rumped Warbler *Phylloscopus chloronotus* | F—Rufous-chinned Laughingthrush *Ianthocincla rufogularis* | G—Wallcreeper *Tichodroma muraria* | H—Chestnut-bellied Nuthatch *Sitta cinnamoventris*. © Samakshi Tiwari.

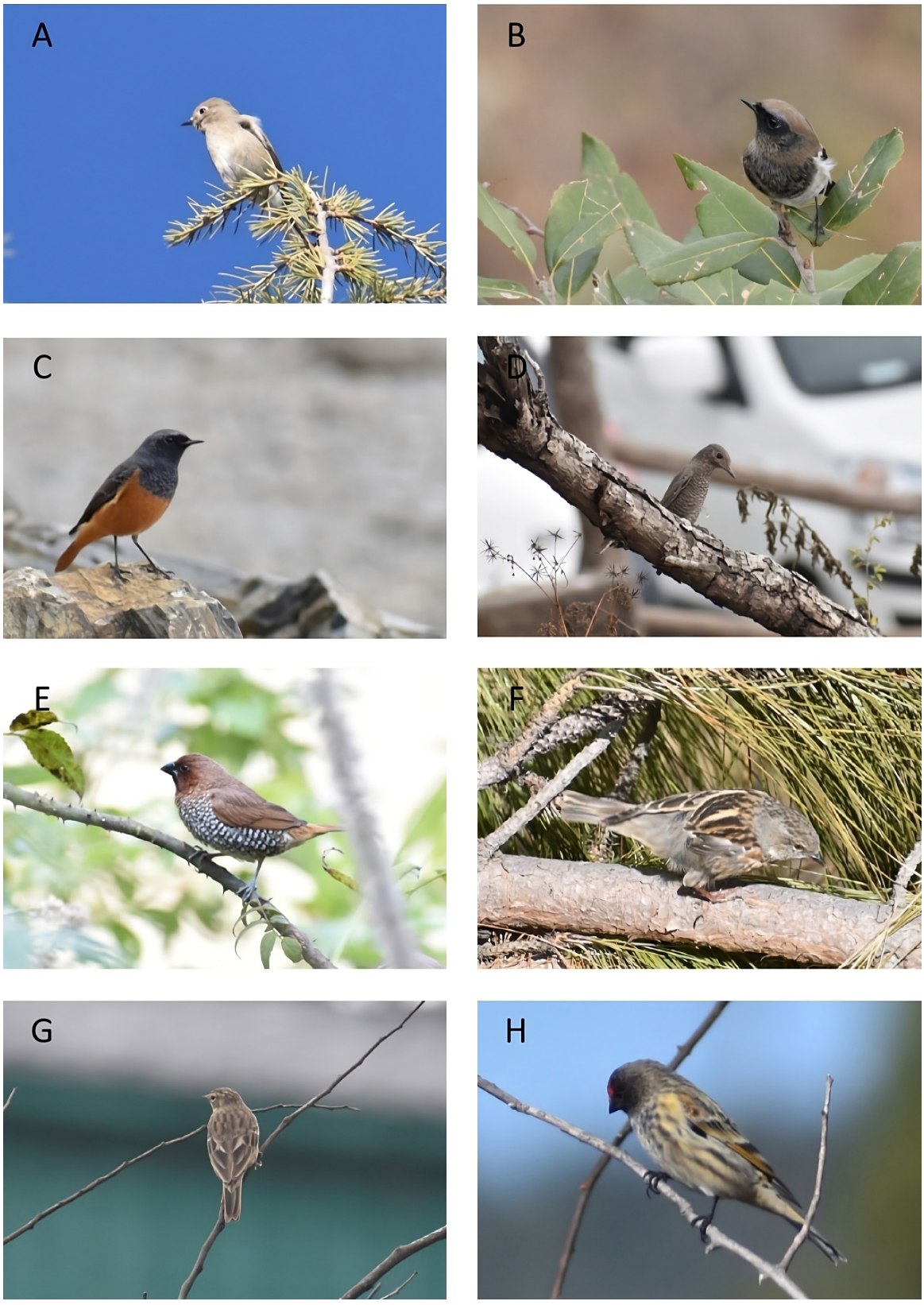

Image 4. Photographic records of some species from the Kanetiya Area: A—Asian Brown Flycatcher *Muscicapa dauurica* | B—Blue-capped Redstart *Phoenicurus coeruleocephala* | C—Black Redstart *Phoenicurus ochruros* | D—Chestnut-bellied Rock Thrush *Monticola rufiventris* | E—Scaly-breasted Munia *Lonchura punctulata*| F—Altai Accentor *Prunella himalayana* | G—Tree Pipit *Anthus trivialis* | H—Fire-fronted Serin *Serinus pusillus*. © Samakshi Tiwari.

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Journal of Threatened Taxa is indexed/abstracted in Bibliography of Systematic Mycology, Biological Abstracts, BIOSIS Previews, CAB Abstracts, EBSCO, Google Scholar, Index Copernicus, Index Fungorum, JournalSeek, National Academy of Agricultural Sciences, NewJour, OCLC WorldCat, SCOPUS, Stanford University Libraries, Virtual Library of Biology, Zoological Records.

NAAS rating (India) 5.64

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Journal of Threatened Taxa

www.threatenedtaxa.org

ISSN 0974-7907 (Online) | ISSN 0974-7893 (Print)

July 2023 | Vol. 15 | No. 7 | Pages: 23463–23630
Date of Publication: 26 July 2023 (Online & Print)
DOI: 10.11609/jott.2023.15.7.23463-23630

Publisher & Host

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