

## AVIAN PREDATORS OF POTATO PESTS

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India is said to be copiously rich in avian wealth (about 1200-over 3000 species, Ali & Futehally 1967, Negi, 1993), many of them being ornamental, recreational, environmental, medicinal, food and agri-insect-pests controlling value. A great variety of climate in country enriches India with seasonal avi-fauna from other parts of world to tender service of reduction of entomeloid in agriculture.

In light of consecutive strongly felt need to reduce indiscriminate chemo-pesticides use in agriculture causing alarming health and environmental hazards, identification and study of bio-control agents other than micro-fauna (bacteria, spider, flies *etc.*) such as avian predator is also matter of particular significance and urgency (Ali & Futehally, 1997). Frequent call and even inaction of legislation for reducing pesticides use e.g. Scandinavian countries enacted legislation, Denmark's call for 50% cut by 1997, Sweden targeted 50% reduction within 5 years and these leads being already followed by other countries and further weightage to such activity.

An attempt to identify avi-wealth and to assess its status as predators of mainly underground pests of potato was made during September, 1996 to March, 1997. A host of battle, weevils, worms, grubs, termites, ants, aphids, hoppers, bugs, flies, caterpillars, borers, moth, loopers, crickets, thrips, snails and slugs *etc.*, belonging to different generous, species and numbering about 80 out of over 100 potato pests reported to damage this crop in India by goggling up both under and above ground parts or as vectors of diseases. For this purpose, a farm of about 300 hectares at Macchri under district Meerut mostly and largely monocultured with potato over about 20 years, thus creating congenial home for regional potato pests was selected. Birds visiting farm during period from field preparation to harvesting operations were closely watched and identified with the help of descriptive cum pictorial book namely, 'Common Birds' written by Salim Ali & F. Laeeq (1967) published from NBT, India, A-5, Green Park, New Delhi 110 016.

Attempt made resulted in identification of 17 avi-predators useful in reduction of regional potato pests (Table 1). They were noticed to pick-up insects during all field operations even from standing crops but particularly during irrigation and soil disturbance at mechanical harvesting, interculture and field preparation operations. They were seen picking up grubs, caterpillars, worms, beetles and other insects. Most active avi-predators were Myna *Acridotheres tristis*, Housecrow *Corvus splendens*, Black Drongro *Dicrurus adsimilis*, Redwattled lapwing *Vanellus indicus* large pied wagtail *Motacilla caspica* & *maderaspatensis*, Cattle Egret *Bulbulcus ibis* and Pied Myna *Sturnus contra*. Most close followers of plough to capture insects were seen to be cattle egret followed by common myna redwattled lapwing, house crow and sometimes black drongo. In absence of cattle egret, common Myna turned to be prime follower of plough. Most close air followers of plough were common myna followed by house crow and rarely cattle egret. Number of common myna was seen also to exceed over all avi-visitors followed by house crow, black drongo and cattle egret. Most active ones were seen to assembling large flocks during morning hours (7-8 A.M.) at ploughing, harvesting and intercultural operations. Number reduced after 11-12 p.m. first by cattle egret and then by house crow. Common myna, large pied wagtail, black drongo, redwattled lapwing and some other small birds (plover *etc.*) continued to tender service of insect-capturing till day light of different months of the period.

House crow, black dronge, sometimes common myna were seen to be in habit of snatching insect picked by other avi-fauna and chasing away them for the same. Black drongo, and sometimes common myna when in large flocks dared to chase away even house (row. Black drongo was seen sitting on large soil clodes or other perches and then hurriedly flying to spot of insect available. This mode of insect collection was too seen in small blue king fisher and chers *Gyps bengalensis* & *indicus* or Saras cranes *Grus antigone* gliding down sometimes to field from nearby tall trees or sky blue jay were observed to be great scarer of all birds seen. Although these birds were noticed to be present but it appeared that they did not feel small insects sufficient for them. They hence used to fly away after small half in the field. Small birds like large pied wagtail and some plovers *etc.*, were seen short, long flying or running all over field to capture insects.

**Table 1.** Avian predator of potato pests.

<b>Scientific &amp; common name of Avi-predator</b>	<b>Vernacular name &amp; Notes</b>	<b>Mode of haunting observed</b>
1. Tree pipet ( <i>Anthus trivialis</i> )	Rugel or charchari, Tseep-Tseep	Enters quietly under plant and picks up insects
2. Common Myna* ( <i>Aeridotheres tritris</i> )	Desi Mayna, Keek-Kee-Keek Kok-Kok-Kok, Churr-Churr	Follow plough closely, attend ploughed and irrigated field in flocks to pick fleeing insects from ground and air.
3. Common Yora ( <i>Aegithina tiphida</i> )	Shoubeggi, musical whistling & long drawn sibilant cheu-cheu	Moving about in pairs through hopping among plants to capture the insects.
4. The Small Blue King Fisher ( <i>Alcedo athis</i> )	Chotta Kilkila or Sharatan, Sharp Chichee-chichee	Flying closely over standing water in the field, drop into water to pickup insect, dashing off to nearby perch for eating the insects.
5. Stone curlew or Goggle-eyed plover ( <i>Burhinus oedienemus</i> )	Karwanak or Barsiri Pick, pick...pick-wick, pick, wick	Attending ploughed and unploughed field in pair or flocks to catch insects, worms <i>etc.</i>
6. Cattle Egret* ( <i>Bubuleus ibis</i> )	Surkhia or Gaj Bagla	Very closely following plough gregariously to catch insects from turning soil, seen haunting in waterfield.
7. House crow* ( <i>Corvus splendens</i> )	Desi Kowa, Kaun-Kaun in various tones	Following plough behind and overhead, attending ploughed, fellow and waterfield, chasing away other birds, snatching for getting insects, eating at spot or taking away, entering water only on seeing insects.
8. Indian roller or Blue Jay ( <i>Coracias benghalensis</i> )	Nilkanth or Sabzak	Swooping down from nearby lookout perch to watered field for picking up insects, flying around or back to same or other perch.
9. Little ringed plover ( <i>Charadrius duhious</i> )	Zirrea or Merwa	Running around whole damp field in loose flocks and stopping suddenly to pick the insects.
10. Black Drongo* ( <i>Decrurus adsimilis</i> )	Bujanga or Katwal	Follow plough distantly and attending ploughed, unploughed, irrigated, unirrigated field, heap of potato haulm & other farm garbage to catch insect from air, casing away other birds including crow to get morsel.
11. Saras crane ( <i>Grus antiqone</i> )	Saras	Landing on ploughed field in pair, bending neck to pick up insects.
12. Adjutant Stork ( <i>Leptoptila dubious &amp; Javanicus</i> )	Harigila, Garua or Dthink	Gliding down heavily on ploughed or unploughed field, entering watered field for eating away insects.
13. Malabar whistling ( <i>Myiophoneus horsfieldii</i> )	Kastura	Coming alone to both ploughing and watered field to catch insects.
14. Large pied wagtail* ( <i>Myiophoneus caspica Moderaspatensis</i> )	Kee-Kee	Running and flying all over watered, ploughing and unploughed field to catch the insect.
15. Pied Myna* ( <i>Sturnus contra</i> )	Ablak or Sirioli	Follow plough and watered field to catch insects.
16. The Redwattled lapwing* ( <i>Lapwing</i> )	Titeeri Did-ye-do-it or	Follow plough, attend unploughed and watered field in small parties to pick-up insects.

( <i>Venellus indicus</i> )	Pity-to-do-it	
17. The common sandpiper	Tee-tee-tee or	Single bird running about watered field to catch
( <i>Tringa hypoleucos</i> )	Wheet Wheet	insects.

[Reference Book: Ali, S and Fatehally, L. 1967. Common Birds, NBT India, A-5 Green Park, New Delhi 1100016]

\* Most actives avian predators of pests.

Common myna, cattle egret, redwattled lapwing, tree pipit, large pied wagtails, common sandpiper, some rare visitors like herons, saras cranes and other egrets were noted to be most active water wandering insect catchers while remaining to be outside watchers and entered water of irrigated field when felt necessary. Some of them like Indian roller & black drongo *etc.*, were recorded to pick up insects from standing water without entering on their feet. Barring redwattled lapwing and cattle egret, all birds under study were also recorded to capture insects from piles of potato haulms and other garbages on farm.

None of the birds under watch was found to eat any part of potato plant although several of them reported to be herbi-cum-insectivorous or herbi-cum-carnivorous. Exception was house crow that was noticed flying away with cut or rotten potato sometimes, attempting to eat recultantly but leaving half eaten. Recorded birds appeared to be completely safe predators of regional above and especially underground pests in potato without any damage from them to the crop, possibly in other root, rhizomatous, tuber crops and sugarcane.

Strictly insectivorous of them in all horticultural and agronomical crops while herbi-cum-insectivorous ones strictly up to field operations, but not after sowing, are also safe avian reducer of entomo-load. Several birds like vulcher, owl, *etc.*, are reported to be alive reducer of rodents.

Only harms excepted from avi-insectivorous are spread of diseases especially viral ones and death of some useful lives like earthworm *etc.*, and predators of insects (some spider & dragon flies *etc.*). The exact value of avi-insectivorous in reducing under ground pests under field conditions is always difficult to determine due to one or other reasons. But a difference in presence of kind/number of pests between a square disturbed and non-disturbed plot exposed to bird visit may generate some idea. Not already existing sporadic shallow study in Indian agri-literatures but a comprehensive scientific investigation led by a team of agri-entomologists (insect identification *etc.*), ornithologist (bird identification *etc.*) and botanist (vegetation identification *etc.*) may lead to efficient workable avian based technology of reducing entomo-strains, protection against damage done by herbi-cum-insectivorous birds and even exploitation of herbi-cum-insectivorous birds without their damage in agriculture.

**Suggestions:** Read as below harvesting efficient services of reducing agri-entomo-strains on agricultural farm by avi-fauna.

- Permanent water source.
- Boundary plantation of vegetation of non-food value to man but of food, resting nesting value to avi-insect-predator on mixed farm of root, tuber including potato, rhizomatous, bulbous selected plantation crops (coconut, rubber, tea *etc.*), cut flowers and sugarcane crops. Need research to identify such vegetation.
- Boundary plantation of vegetation of non-human-food value but of nesting and resting value to strictly insects and carnivorous birds on farm crops susceptible to bird damage. Research needs to identify such vegetation.
- Cultivation of bird amaze free crops like coconut, most cut flower crops, bel and colosassia *etc.*, to force birds to feed upon insects.
- Frequent deep required soil disturbance, irrigation and exposure of field of avi-insect-predators for acting upon.
- Identification of regional/climate/crop specific avi-insect-predators in addition to general types coming to all crops, Reason being, not all birds visit same crop, region climate and season.
- Restricted use of chemo-insecticides lethal or repelling avian insectivorous from visiting field itself.
- Development of non-toxic spray enabling plants to repel avi-cum herbivorous but attracting insectivorous birds.
- Minusing genes responsible for herbivoracity from insect cum herbivorous birds (House crow, poultry birds, ducks *etc.*) and induction of genes liable for easy to tame, strong identification of residence to return same, response to human inviting call from white pigeon into them, or incorporation of genes responsible for strong insectivoracity from strictly insectivorous birds into white pigeon through advanced bio-techniques may lead to development of bird stocks of enhanced insect controlling or multipurpose value. Attempts to breed out or breed in desirable or undesirable characters will be more useful in birds with capacity to escape from predator or capacity by immediate flying away. Capacity to escape from catching lacks in weak fliers (poultry bird or ducks *etc.*). Idea appears to be funny, But in light of recent advancement of bio-technology does not seem to be so funny. Synthesized birds for this purpose should be strong insectivorous nature, free from herbivoracity, able to identify residence to

return same, able to respond human inviting call and escaping from catching, able to forage within restricted area, need not to be caged always. These all qualities do exist in white pigeon which has also good value in Tripura and tamed for the same but lacks strongly in insectivoracity. Needless to mention that wide variability in these characters does axise among birds belonging to same species, genera, family, class for this purpose.

### Some Common Himalayan Birds

EXISTING NAME*	NEW NAME**	SCIENTIFIC NAME
Mountain Quail, Himalayan or Indian Mountain Quail	Himalayan Quail	<i>Ophrysia superciliosa</i>
Impeyan Pheasant, Monal Pheasant, Himalayan Monal	Himalayan/Impeyan Monal	<i>Lophophorus impejanus</i>
Darjeeling Pied Woodpecker	Darjeeling Woodpecker	<i>Dendrocopos darjellensis</i>
Himalayan Pied Woodpecker	Himalayan Woodpecker	<i>Dendrocopos himalayensis</i>
Himalayan Goldenbacked Threetoed Woodpecker, Himalayan Goldenback	Himalayan Flameback	<i>Dinopium shorii</i>
Himalayan Great Slaty Woodpecker	Great Slaty Woodpecker	<i>Mulleripicus pulverulentus</i>
Great Pied Kingfisher, Himalayan Pied Kingfisher	Crested Kingfisher	<i>Megaceryle lugubris</i>
Himalayan Cuckoo	Oriental Cuckoo	<i>Cuculus saturatus</i>
Indomalayan Swiftlet, Black-nest Swiftlet	Black-nest Swiftlet	<i>Collocalia maxima</i>
Darkbacked Swift, Khasi Hill Swift	Dark-rumped Swift	<i>Apus acuticauda</i>
Tawny Wood Owl	Tawny Owl	<i>Strix aluco</i>
Himalayan Greyheaded Fishing Eagle, Lesser Fishing Eagle, Lesser Greyheaded Fishing Eagle	Lesser Fish-Eagle	<i>Ichthyophaga humilis</i>
Himalayan Griffon Vulture	Himalayan Griffon	<i>Gyps himalayensis</i>
Redbreasted Falconet	Collared Falconet	<i>Microhierax caerulescens</i>
Jay	Eurasian Jay	<i>Garrulus glandarius</i>
Himalayan Tree Pie	Gray Treepie	<i>Dendrocitta formosae</i>
Magpie, Whiterumped Magpie	Black-billed Magpie	<i>Pica pica</i>
Nutcracker, Eurasian Nutcracker	Spotted Nutcracker	<i>Nucifraga caryocatactes</i>
Kashmir Red-breasted Flycatcher	Kashmir Flycatcher	<i>Ficedula subrubra</i>
Himalayan Rubythroat	White-tailed Rubythroat	<i>Luscinia pectoralis</i>
Himalayan Tree Creeper	Bar-tailed Tree-Creeper	<i>Certhia himalayana</i>
Altai Accentor	Rufous-streaked Accentor	<i>Prunella himalayana</i>
Sikkim Tree Creeper	Brown-throated Tree-Creeper	<i>Certhia discolor</i>
Crossbill, Common Crossbill	Red Crossbill	<i>Loxia curvirostra</i>
Goldcrest	Common Goldcrest	<i>Rugulus regulus</i>
Manipur Streaked Laughing Thrush	Striped Laughingthrush	<i>Garrulax virgatus</i>
Himalayan Greenfinch	Yellow-breasted Greenfinch	<i>Carduelis spinoides</i>
Goldfinch, Eurasian Goldfinch	European Goldfinch	<i>Carduelis carduelis</i>

\* Names used in the subcontinent;

\*\* Names from Pittie & Robertson 1993, Ripley *et al.* (in press), and a few cases from Inskipp *et al.* 1996

[Source: ENVIS Newsletter: Avian Ecology and Inland Wetlands, Vol.2 No.4, ENVIS Centre, Bombay Natural History Society, Salim Ali Chowk, Shaheed Bhagat Singh Road, Mumbai 400 023]