

Grid Computing for Biodiversity Conservation: Building an Image Database of Resident and Migratory Birds in Ateneo de Manila University

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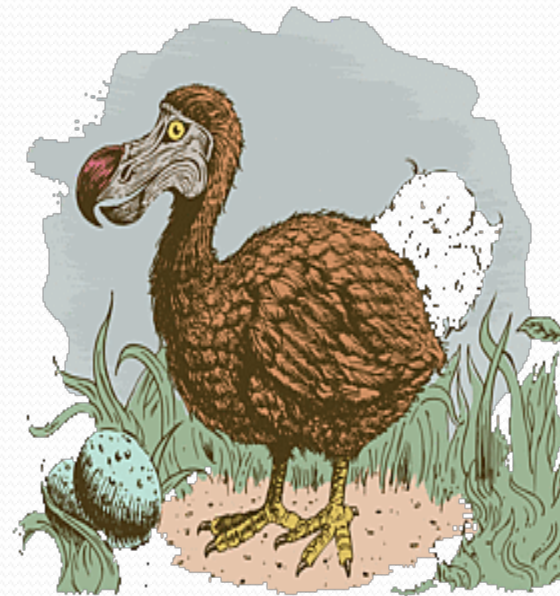
BIODIVERSITY

- “the degree of variation of life forms within a given ecosystem, biome, or an entire planet”
- “A measure of the health of ecosystems. Greater biodiversity implies greater health”

Loss of Biodiversity: Extinction Rate

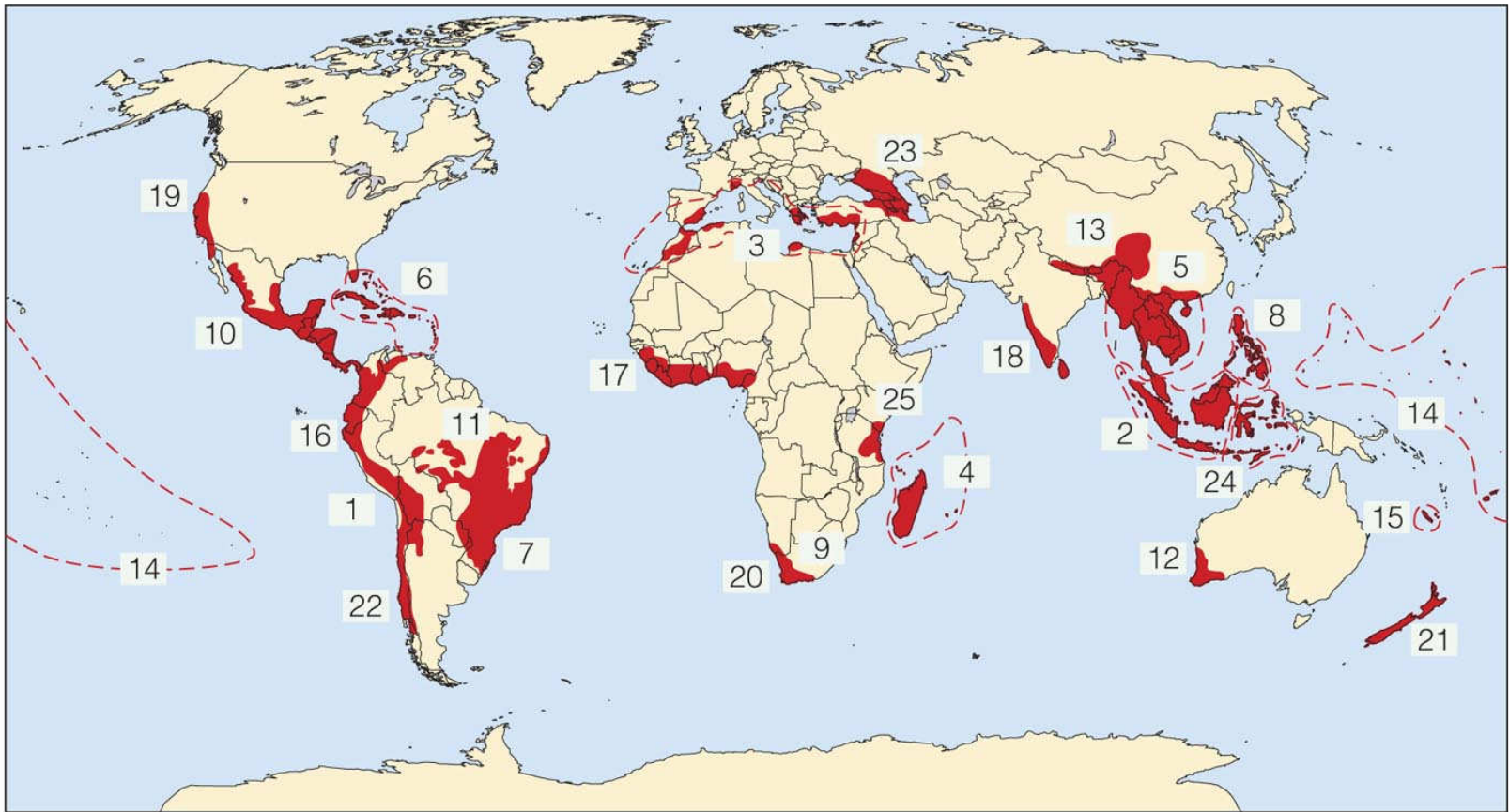
If there are:

- 100,000,000 different species on Earth
- and the extinction rate is just 0.01% / year
- *at least* 10,000 species go extinct every year



DODO (*Raphus cucullatus*, endemic to Mauritius), an extinct bird.

World Biodiversity Hotspots



Philippines: A Biodiversity Hotspot

- The world's second largest archipelago country (after Indonesia), the Philippines includes more than 7,100 islands covering 297,179 km² in the westernmost Pacific Ocean.

“One of the few nations that is, in its entirety, both a hotspot and a megadiversity country, placing it among the top priority hotspots for global conservation.”



Philippines: Vital Signs

- Hotspot Original Extent (km²): 297,179
- Hotspot Vegetation Remaining (km²): 20,803
- Endemic Plant Species: 6,091
- Endemic Threatened Birds: 56
- Endemic Threatened Mammals :47
- Endemic Threatened Amphibians: 48
- Extinct Species:† 2
- Human Population Density (people/km²): 273
- Area Protected (km²): 32,404
- (Source: Conservation International)

Biodiversity Informatics

- “Application of informatics techniques to biodiversity information for improved management, presentation, discovery, exploration and analysis.”

Bird Ecology Study Group

- Ateneo Bird Ecology Study Group (ABES)
- an interdisciplinary group of researchers (biology, environmental science, mathematics, engineering, physics, etc.)

Grid Computing and Biodiversity

BUILDING A BIODIVERSITY GRID.

- Andrew C. Jones Richard J. White, W. Alex Gray, Frank A. Bisby, Neil Caithness, Nick Pittas, Xuebiao Xu, Tim Sutton, Nick J. Fiddian and Alastair Culham et al.

Abstract

- **In the BiodiversityWorld project we are building a GRID to support scientific biodiversity-related research. The requirements associated with such a GRID are somewhat different from other GRIDs, and this has influenced the architecture that we have developed. In this paper we outline these requirements, most notably the need to interoperate over a diverse set of legacy databases and applications in an environment that supports effective resource discovery and use of these resources in complex workflows. Our architecture provides an invocation model that is usable over a wide range of resource types and underlying GRID middleware. However, there is a trade-off between the flexibility provided by our architecture and its performance. We discuss how this affects the inclusion of computationally intensive applications and applications that are highly interactive; we also consider the broader issue of interoperation with other GRIDs.**
- *Source: Grid Computing in Life Science. Lecture Notes in Computer Science, 2005, Volume 3370/2005, 140-151, DOI: 10.1007/978-3-540-32251-1_13*

Grid Computing and Biodiversity

- GLOBAL BIODIVERSITY INFORMATION FACILITY
- <http://www.gbif.org/>

“Free and open access to biodiversity data”

- “GBIF's mission is to make the world's biodiversity data freely and universally available via the Internet. As a megascience initiative, GBIF aims to provide an essential global informatics infrastructure for biodiversity research and applications worldwide.”

Grid Computing and Biodiversity

- *Available resources and networks that can be tapped:*
- ADMU Cluster (Ateneo de Manila University)
- Psci-Grid (Philippine e-Science Grid)
- EUAsiaGrid (Europe, Asia and Asia)
- PandaGrid (Europe and Asia)
- EGI-InSPIRE Project (Europe, Asia and Australia)
- Academia Sinica Biodiversity Conservation Center
- Computing Society of the Philippines-Special Interest Group on Computational and Systems Biology
- PREGINET (Phil. Research Network)

East Asian-Australasian Flyway

- “One of the world's great flyways.”
- “At its northernmost it stretches eastwards from the Taimyr Peninsula in Russia to Alaska.”
- “Its southern end encompasses Australia and New Zealand. Between these extremes the Flyway covers much of eastern Asia, including China, Japan, Korea, South-East Asia and the western Pacific. “

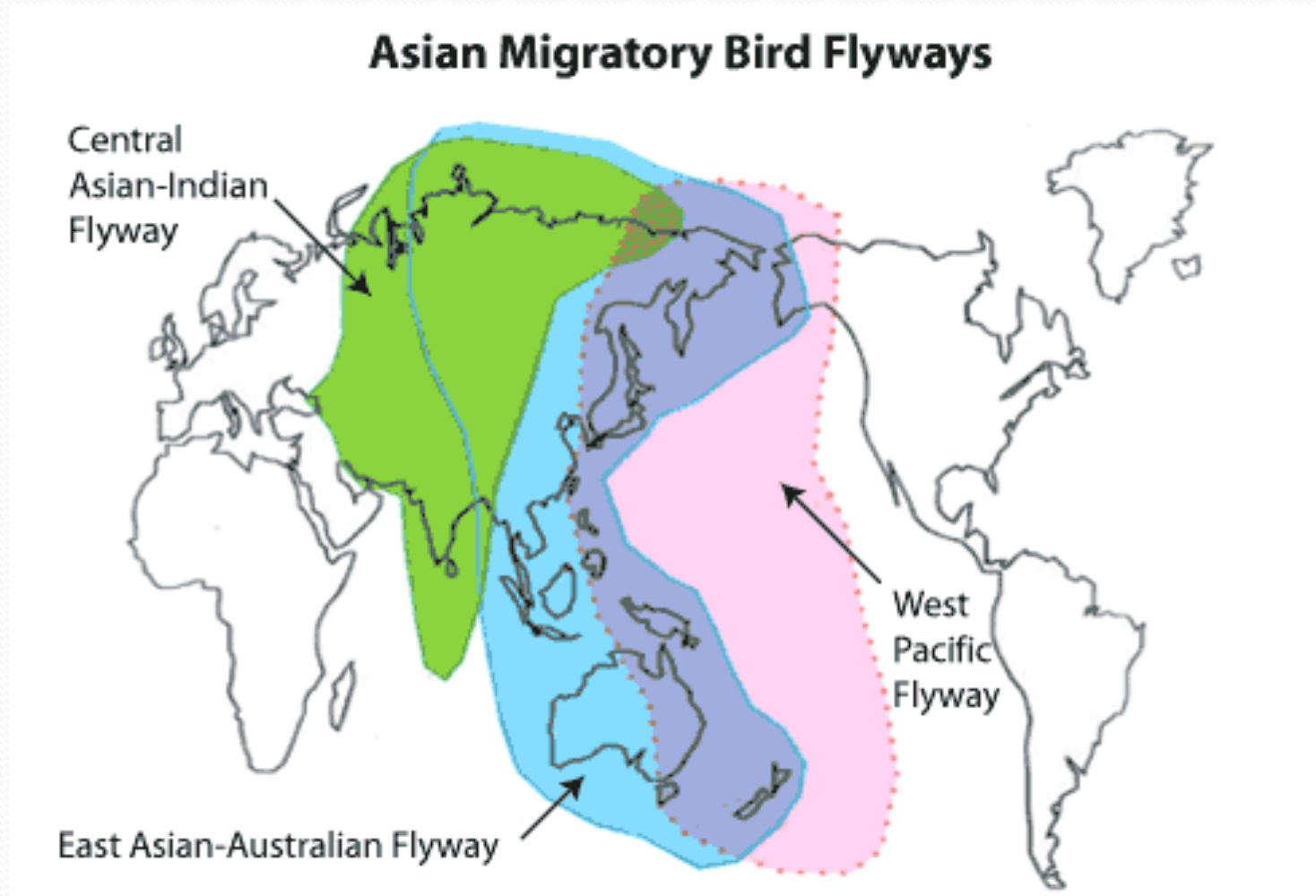


East Asian-Australasian Flyway

- “Very important for the millions of migratory waders or shorebirds that breed in northern Asia and Alaska and spend the non-breeding season in South-East Asia and Australasia”
- “In total, the flyway passes through 22 countries with approximately 55 migratory species travelling along it, equating to about 5 million birds.”



East Asian-Australasian Flyway



Partnership for East-Asian Australasian Flyway

- <http://www.eaaflyway.net/>
- Launched in November 2006, the Partnership is an informal and voluntary initiative, aimed at protecting migratory waterbirds, their habitat and the livelihoods of people dependent upon them.
- There are currently 25 partners including 13 countries, 3 intergovernmental agencies and 9 international non-government organisations.

East Asian-Australasian Flyway

- The Partnership provides a framework for international cooperation, including:
- development of a Flyway Site Network (for sites of international importance to migratory waterbirds)
- collaborative activities to increase knowledge and raise awareness of migratory waterbirds along the flyway
- building capacity for the sustainable management and conservation of migratory waterbird habitat along the flyway.

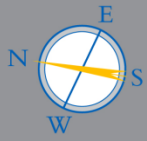


Threats to Migratory Birds

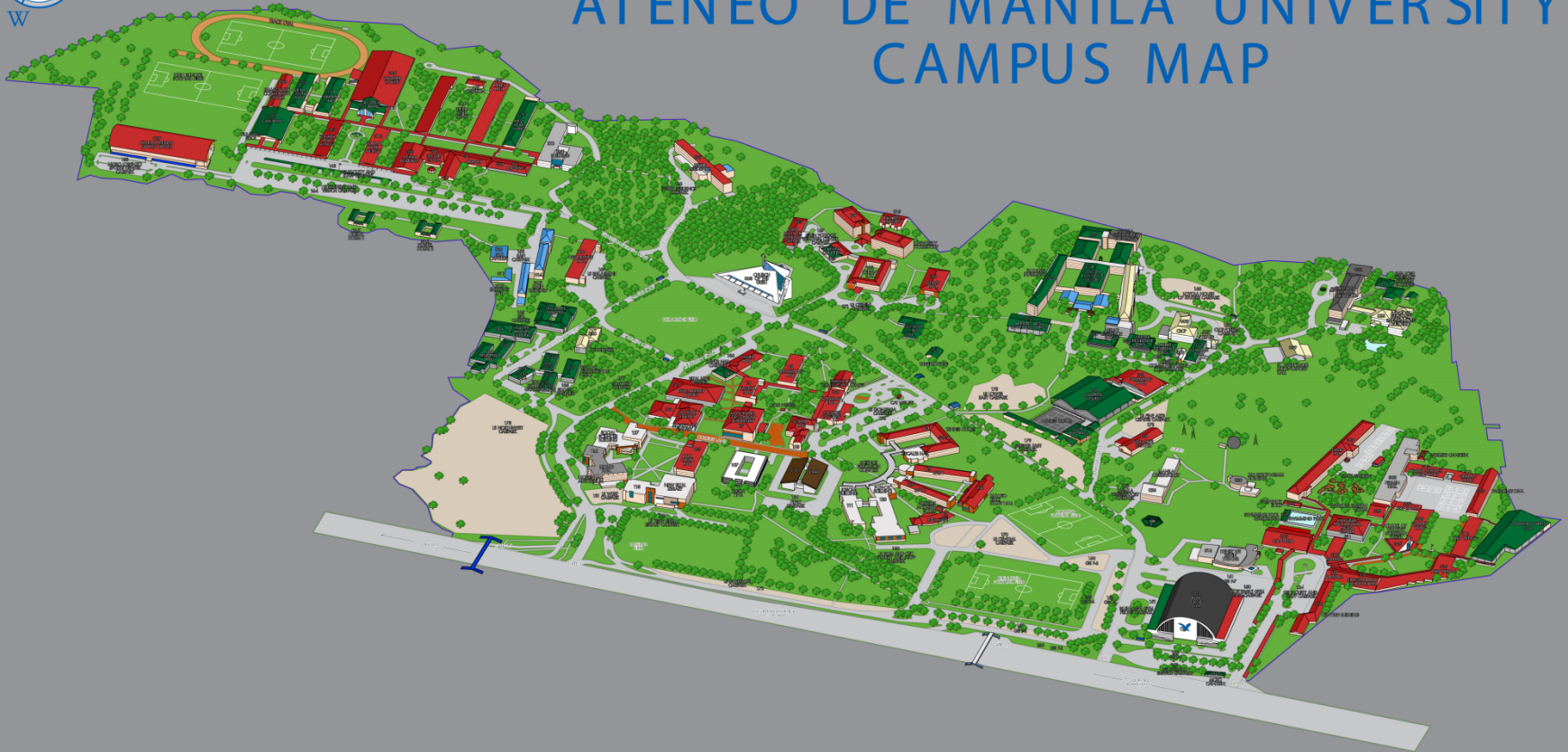
- **Threats to migratory waterbird and their habitats include:**
- Loss of habitat through reclamation of wetlands
- Loss of habitat due to intensifying agriculture
- Degradation of habitat through pollution
- Reduction or diversion of water supply
- Increase in disturbance by humans
- Invasive plants and predators

BIRDS IN ATENEEO DE MANILA UNIVERSITY





ATENEO DE MANILA UNIVERSITY CAMPUS MAP



The Ateneo University is one of the few **green spaces** in Metro Manila.

ATENEO BIRD LIST (2006 – 2011)

Source: Wild Bird Club of the Philippines



Ateneo Birdlist

(WBCP Records 2006-11)

30 Resident

Non-endemics

6 Endemics

7 Migrants



Ateneo Birdlist

(WBCP Records 2006-11)

1. Black-crowned Night-Heron *Nycticorax nycticorax*
2. Peregrine Falcon *Falco peregrinus*
3. Barred Rail *Gallirallus torquatus*
4. Plain Bush-hen *Amaurornis olivacea*
5. White-breasted Waterhen *Amaurornis phoenicurus*
6. Pink-necked Green-Pigeon *Treron vernans*
7. Red Turtle-Dove *Streptopelia tranquebarica*
8. Zebra Dove *Geopelia striata*
9. Colasisi *Loriculus philippensis*
10. Brush Cuckoo *Cacomantis variolosus*
11. Philippine nightjar *Caprimulgus manillensis*
12. Glossy Swiftlet *Collocalia troglodytes*
13. Common Kingfisher *Alcedo atthis*
14. White-throated Kingfisher *Halcyon smyrnensis*
15. White-collared Kingfisher *Todiramphus chloris*
16. Coppersmith Barbet *Megalaima haemacephala*
17. Philippine Pygmy Woodpecker *Dendrocopos maculatus*
18. Red-bellied Pitta *Pitta erythrogaster*
19. Barn Swallow *Hirundo rustica*
20. Pacific Swallow *Hirundo tahitica*
21. Pied Triller *Lalage nigra*
22. Yellow-vented Bulbul *Pycnonotus goiavier*
23. Black-naped Oriole *Oriolus chinensis*
24. Large-billed Crow *Corvus macrorhynchos*
25. Oriental Magpie-Robin *Copsychus saularis*
26. Blue Rock-Thrush *Monticola solitarius*
27. Golden-bellied Flyeater *Gerygone sulphurea*
28. Arctic Warbler *Phylloscopus borealis*
29. Tawny Grassbird *Megalurus timoriensis*
30. Striated Grassbird *Megalurus palustris*
31. Grey-streaked Flycatcher *Muscicapa griseisticta*
32. Pied Fantail *Rhipidura javanica*
33. Grey Wagtail *Motacilla cinerea*
34. Richard's Pipit *Anthus richardi*
35. White-breasted Wood-swallow *Artamus leucorhynchus*
36. Long-tailed Shrike *Lanius schach*
37. Brown Shrike *Lanius cristatus*
38. Olive-backed Sunbird *Cinnyris jugularis*
39. Red-keeled Flowerpecker *Dicaeum australe*
40. Orange-bellied Flowerpecker *Dicaeum trigonostigma*
41. Lowland White-eye *Zosterops meyeri*
42. Eurasian Tree Sparrow *Passer montanus*
43. Scaly-breasted Munia *Lonchura punctulata*

Shrike Family

- Shrikes are passerine birds of the family Laniidae. The family is composed of thirty-one species in three genera. The family name, and that of the largest genus, *Lanius*, is derived from the Latin word for "butcher", and some shrikes were also known as "butcher birds" because of their feeding habits.
- Long-Tailed Shrike (*Lanius schach*)
- Brown Shrike (or Philippine Shrike) (*Lanius cristatus*)



SHRIKEOLOGY / SHRIKEOLOGISTS

- SHRIKEOLOGY is the discussion group for all researchers interested in SHRIKES.

Created in March 1999, Shrikeology works under the International Shrike Working group (ISWG) as a common forum for persons interested in shrikes.

If you wish to send an e-mail message to the group the address is:

shrikeology@yahoogroups.com

Long-Tailed Shrike

- The **Long-tailed Shrike** or the **Rufous-backed Shrike** (*Lanius schach*) is a member of the bird family Laniidae, the shrikes.
- A resident / territorial bird in the Philippines.

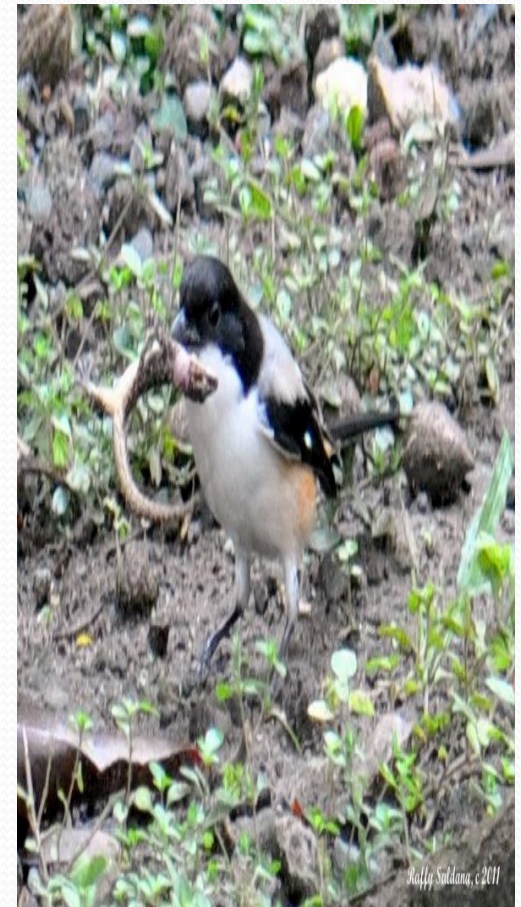


Brown Shrike

- The **Brown Shrike**, *Lanius cristatus* is a bird in the shrike family that is found mainly in Asia.
- Like most other shrikes, it has a distinctive black "bandit-mask" through the eye, and is found mainly in open scrub habitats, where it perches on the tops of thorny bushes in search of prey.
- A migratory bird (in the Philippines)



“Bob” Shrike



ADD Bob Shrike on Facebook... Account Name: BOB SHRIKE

BROWN SHRIKE



Brown Shrike of Ateneo (Manila)



Brown Shrike of Taipei (Taiwan)

Long-Tailed Shrike Video



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- Ateneo de Manila University
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- EUAsiaGrid Project
- EGI-InsPIRE Project
- PANDA Grid Project
- PsciGrid Project

THANK YOU

***MARAMING
SALAMAT PO!***

Questions?

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