

Summer-flooded Fields and Shorebirds

Creating Stopover Sites for Shorebirds on their Fall Migration in Summer-flooded Wheat Rotation Fields

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■How it began

Suddenly in the midst of brilliant green midsummer rice paddies, a large expanse of open water. Dragonflies flit overhead, egrets and herons flock together. Unlike abandoned rice paddies full of *Monochoria korsakowii* and Arrowhead, and again unlike abandoned dry fields full of reeds and willows, the area appears well-tended; where weeds have grown they've been plowed under and the water is clean.

In 2007, the birdwatchers' grapevine was abuzz with how many shorebirds could be observed in such places, and this led the Oryza Net to survey what kind of agricultural lands attracted what sort of birds, what they were eating and what aquatic creatures could be found.

It is now 5 years later. We did surveys in Kasukabe and Gyoda Cities in Saitama prefecture, Utusnomiya and Oyama Cities in Tochigi pref. and Mikawa-machi in Yamagata prefecture, and found many more waterbirds and aquatic organisms than we expected. With rice paddies' function as wetlands attracting attention, a Ministry of Agriculture, Forestry and Fisheries program to directly support agriculture designed to protect the environment started granting subsidies to "winter-flooded rice paddies" in fiscal 2011. We hope that "summer-flooded fields" that function as habitat for shorebirds will also receive support, and that this practice will spread throughout Japan.



■What are summer-flooded fields?

- Fields where rotational wheat has been planted to refresh the soil for rice cropping, and also where interim crops of soybeans or rice for other-than-human consumption cannot be raised.
- Wheat fields being flooded from July to August after the wheat harvest to prevent continuous cropping damage and control weeds.

■Why flood the fields? Management advantages of summer flooding

- Prevents problems from continuous wheat cropping ... Damping off prevented by 20 days' flooding (Report from a farm in Saitama prefecture)
- Controls weeds that grow in wheat-cropping season... Common wild oat growth hindered

by 20 days' flooding, Italian ryegrass hindered by 60 days' flooding* (Report from a wheat crop indicator project in Tochigi prefecture)

- Summer weed control... Herbicide not needed. Flooded fields require only about one third the labor, fuel and machinery wear & tear of non-flooded fields. (Inquiry from a farm in Utsunomiya City)

In spite of these clear merits, for unknown reasons summer-flooding management is not widespread.



カラスムギ Common Wild Oat



ネズミムギ Italian ryegrass

※Y. KIDA , M. ASAI, 2006.
Based on effects of summer flooding on survival of Common Wild Oat and Italian ryegrass seeds. "Zasso Kenkyu" 51, 87-90]

■The Summer-flooding regime

June: wheat harvest -> July: plowing -> July-August: wet plowing -> maintaining water depth, plowing weeds under to maintain open water -> September: draining



Wheat harvest in June



Plowing weeds under

■What birds are attracted to summer-flooded fields?

Migrants such as shorebirds (waders), Sand Martin. Summer birds such as Intermediate Egret, Cattle egret, Little Ringed Plover, Barn Swallow. Residents such as Little Egret, Spot-billed Duck, Japanese Wagtail. Freshwater wetland-loving species such as Spotted Redshank, Ruff, Wood Sandpiper and Green Sandpiper numerous. Many juveniles.

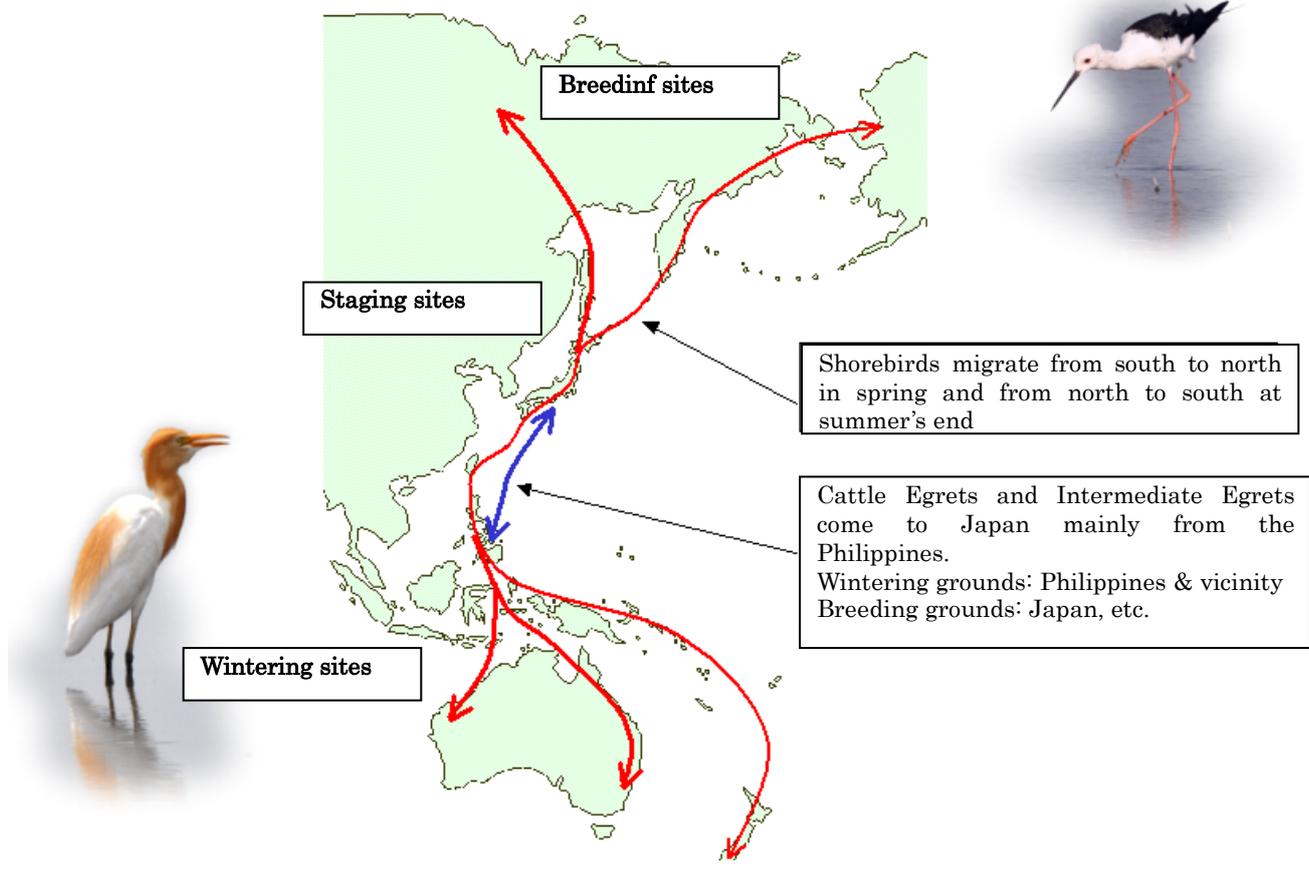
Cattle Egrets and Intermediate Egrets come to Japan mainly from the Philippines.

Wintering grounds: Philippines & vicinity

Breeding grounds: Japan, etc.

Shorebird Migration Routes

シギ・チドリ類の渡りルート



■Why do the birds visit these fields?

Mostly to find food. Some are observed resting or drinking water. In places where few shorebirds are seen during the day, flocks sometimes arrive at night to feed.

■What aquatic organisms are found in these fields?

Species of Daphnia, non-biting midges, aquatic beetles and diving beetles such as *Cybister japonicus*, Water Stick insects, Wandering Glider and damselfly larvae, Weather Loaches, frogs, and so on. Different assemblies of organisms occur depending on the surroundings environment, but non-biting midge and Wandering Glider larvae were commonly observed in number at every site. The latter in particular were present in a variety of sizes and great numbers, and shorebirds and egrets, etc. were observed eating them. Many aquatic organisms appear two weeks after flooding, but to ensure their growth to adulthood the fields must not be allowed to dry out.



ユスリカ幼虫とシオカラトンボヤゴ

Larvae of non-biting midges and Common Skimmers



さまざまなサイズのウスバキトンボヤゴ

Various sizes of Wandering Glider larvae

■What are the birds eating?

• The following birds were recorded feeding on the following organisms:
Wood Sandpiper, Spotted Redshank, Greenshank, Black-winged Stilt and Little Ringed Plover feeding on Wandering Glider larvae; Greenshank feeding on Weather Loach, Rufous-necked Stint feeding on non-biting midge larvae, and Common Snipe feeding on worms.



コチドリ

Little Ringed Plover



アオアシシギ

Greenshank



チュウサギ

Intermediate Egret

■What conditions make a field attractive to shorebirds?

- Water depth less than 5 cm is preferred; egrets, herons and ducks dominate in water over 15 cm deep.

The larger the area the better and the more prey organisms the better. Open water is a must.

Many mysteries remain about the effects of location along an existing migratory route, or location in a valley or other topographical factors on the attractiveness of a project site to shorebirds.

■Case studies of summer-flooded field projects with awareness of their function as shorebird habitat Kasukabe City, Saitama (started about 2000)

About ten years ago, summer flooding was started to prevent continuous wheat cropping damage and control weeds. Awareness of shorebird habitation arose more recently, and the proper depth for aquatic organism growth is now maintained and open water is being

maintained through frequent wet plowing. Shorebirds confirmed in 2011 included Black-winged Stilt, Green Sandpiper, Wood Sandpiper, Lesser Golden Plover, Greenshank, Common Snipe, Common Sandpiper, Little Ringed Plover and Gray-headed Lapwing. In recent years this site has become very popular with birdwatchers.



抑草のための代かき
Wet plowing for weed control



アオアシシギ(左)とエリマキシギ(右)
Greenshank (L) and Ruff (R)

Mikawa-machi, Yamagata prefecture (2010-)

On the Shonai Plain about 8 km from the sea, with the Akagawa River flowing nearby. Summer-flooded fields not close to each other. Two fields of 60 a each and one of 40a, making a total of 1.6 ha. Double-cropping organic farming of wheat and soybeans. Continuous cropping had led to decreased yields. Conditions not suitable for winter-flooding, but water supplies available in summer. The project was started on the basis of enhancing both agriculture and biodiversity. On 30-31 August 2011, Wood Sandpiper, Ruff, Greenshank, Common Snipe and Long-toed Stint were observed. At other times, the farmer also confirmed Black-winged Stilt, Little Ringed Plover and Lesser Golden Plover and observed flocks of several dozen shorebirds while draining the fields in early September. Fields flooded for 2 months (July-August). Water supplies became unavailable in late August, and sowing wheat started in late September, so fields were drained starting in Sept. Damage from ducks eating rice ears along the edges of neighboring paddies was dealt with by stringing twine along the ridges between the fields.



サギ類の群れ
A flock of Egrets



農家による生き物調査
A farmer surveying organisms

Utsunomia City, Tochigi prefecture (2011-)

In the upper Kinugawa River watershed. Some years ago, the news that summer flooding enhances wheat crops spread by word of mouth, and summer flooding appeared here and there in this area. In 2010, an interested farmer observed Black-tailed Godwit and Marsh Sandpiper. In 2011, a local farmer invited others in the area to join a project to flood fields for bird habitat, and 14 fields belonging to 6 households totaling 7 ha were flooded and surveyed. In 2011 Little Ringed Plover, Greenshank, Green Sandpiper, Wood Sandpiper, Common Snipe, etc. were observed. Aquatic organisms such as Giant Water Bug proliferated. Concerns about water leaking into neighboring rice paddies at harvest time and preparations for sowing wheat led to most fields being drained in late August. Most areas were kept about 15 cm deep, attracting many egrets, herons and ducks, with fewer shorebirds. Other possible

unconfirmed factors - distance from migration routes and presence of high-tension electricity towers, meaning more raptors (?)



農家による生き物調査

A farmer surveying organisms



採集された水生生物

Aquatic organisms collected

[Aquatic organisms in photo (L)]
 Wandering Glider larvae
 Water Stick insect
 Ferocious Water Bug
 Giant Water Bug
 Water Scavenger beetle
 Koshima diving beetle,
 etc.

Gyoda City, Saitama prefecture (2008-)

A large-scale agricultural development project area covering 72 ha alongside the Tonegawa River. Wheat and soybeans were grown during the construction phase until facilities were completed about 10 years after the project's start. Agricultural water supplies were not provided, and continuous cropping damage coincided with construction phase completion in 2009, so the entire area was flooded from mid-August until late September. More shorebirds than expected arrived, with flocks of Spotted Redshank, Black-tailed Godwit, Marsh Sandpiper, etc. being observed; feeding behavior was also frequently observed. Species were numerous, with 19 species of shorebird confirmed. In 2010 a project to promote paddy field use began, and many fields were planted with wheat/soybean rotations or with rice for other-than-human-consumption uses, and less area was flooded in summer. In 2011 fields were flooded starting in early Sept., and two weeks later Spotted Redshank and Greenshank were observed. Project managers had planned to flood these fields in mid-August but the schedule was delayed. In future, although the area flooded will be limited, expectations are high for creation of an effective shorebird stopover site.



水張り後の代かきと、集まったツバメ

Wet plowing after flooding attracts a flock of Barn Swallows



オグロシギとエリマキシギの群れ

Flock of Black-tailed Godwit and Ruff