

SCIENCE

ins anew in May's rice paddies

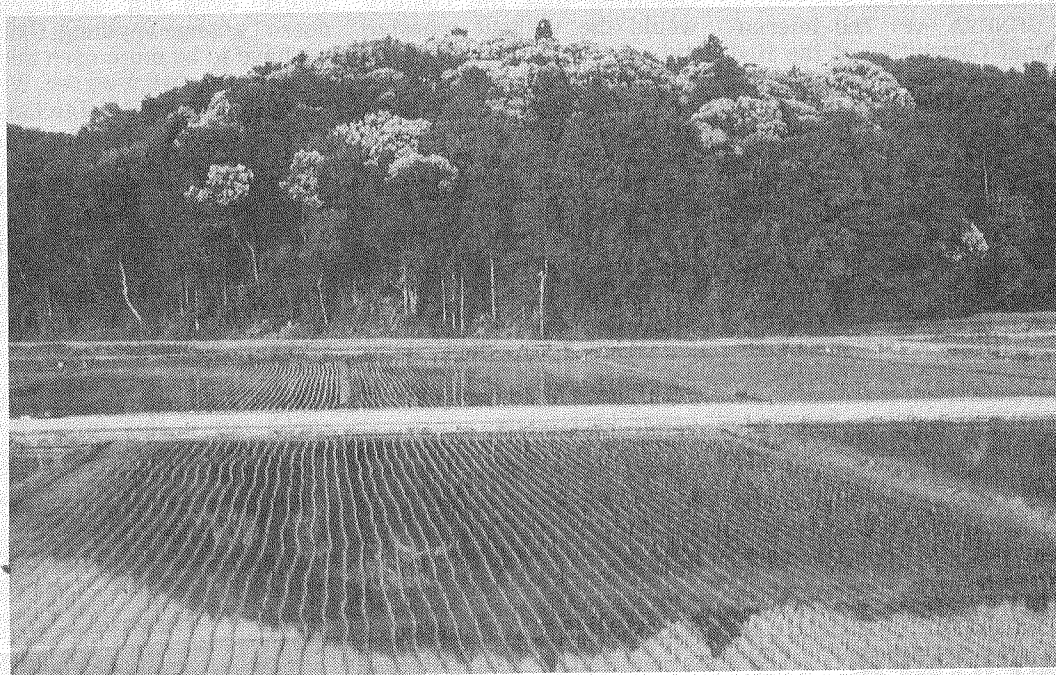
water well into summer, plenty of time for their eggs to hatch into tadpoles, and the tadpoles to develop into miniature frogs.

Crayfish have spent the winter hibernating deep in the paddy mud. The inflow of new water is a signal for them to emerge and begin feeding on unwary fish, as well as on the tender young buds of water plants (including, unfortunately, the rice seedlings). The crayfish you see in rice fields and irrigation ditches are American crayfish, brought to Japan in 1930 as feed for the bullfrog aquaculture programs. Now these aggressive invaders have spread throughout the lowland rice districts. The habitat of the native Japanese crayfish is restricted to mountain streams in the northern part of the country.

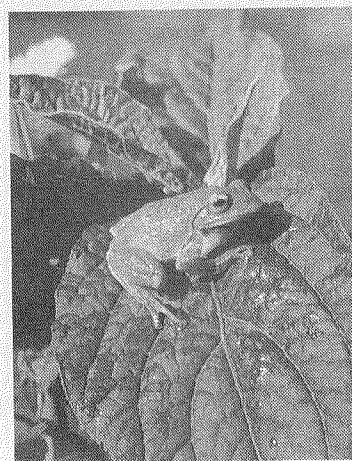
Dragonfly eggs, laid down in the fall, hatch out into swimming nymphs, called naiads or *yago*. These voracious hunters have specialized jaws which can be snapped out at lightning speed. They ambush other insects, and even small fish, and must grow and molt several times before crawling out and metamorphosing into masters of the air.

A bucket of water scooped from a rice paddy is swarming with aquatic insects: water scorpions, toe-biters, diving beetles, whirligigs, boatmen and backswimmers. Blood-sucking leech lurk among the seedlings, and the surface of the paddy is alive with water striders (sometimes called "Jesus-bugs" for their ability to walk on water). Water striders slide effortlessly over the surface film, feeding on mosquitoes and other tiny flying insects that fall into the paddy.

Barn Swallow and house martin, back home from southern wintering grounds,



JAPANESE CHINKAPIN TREES bloom alongside a newly planted rice field. Coexisting together for two millennia, the paddies' wildlife have adapted their biological clocks to the rice farmers' harvest calendar. PHOTOS BY KEVIN SHORT



SCHEGEL'S GREEN TREE FROG (*Rhacophorus schelegelii*) kills time on the dike alongside a rice field. On the right, the annual rice planting isn't quite the backbreaking work it used to be, thanks to specialized tractor attachments.

chicks, spend entire days flying back and forth from nest to paddy. Starling, crow and turtle dove forage in the shallow areas around the edge of the paddy. A convenient overhang may contain a common kingfisher, waiting patiently for a chance to plummet down onto a loach or bitterling.

The Dusky Thrush, winter visitors from Siberia, are reluctant to return home until they have had a shot at foraging in the newly flooded paddies. Golden Plover arrive from their southern wintering grounds, spend a few weeks feeding intensively and storing up fat reserves, then leave

habitats. Intensive rice cultivation reached Japan in the Yayoi Period, about 200 B.C. Japanese wildlife — insects, fish, mollusks, crustaceans, amphibians, reptiles, birds and even mammals such as weasels — have thus had two millennia to adapt their behavior and seasonal activities