About 450 species of blood parasites have been recorded from nearly 4,000 sampled bird species (Bishop & Bennett 1992). Due to their potential detrimental affects on the reproduction and survival of different bird species (e.g. Sundberg 1995; Dufva 1996), blood parasites are gaining increasing prominence (McCallum & Dobson 1995; Sodhi 1995; Dale et al. 1996). Before blood parasites can be used for various rigorous ecological studies, it is an important first step to determine the level of prevalence of blood parasites in various species. We determined the prevalence of five blood parasites (Haemoproteus spp., Trypanosoma spp., Splendidofilaria spp., Plasmodium spp. and Leucocytozoon spp.) in five Sylviidae species (Cisticola juncidis, Locustella pryeri, L. pleskei, Acrocephalus arundinaceus, and A. bistrigiceps) in Japan.

Previously we found that seven Emberiza species have low blood parasite presence in three of the study sites, Kamisu, Ukishima, and Seimei (Sodhi et al. 1996; Sodhi et al. 1999). Only three species, E. rustica, E.spodocephala and E. schoeniclus, were infected with a blood parasite. We also examined four Sylviidae species inhabiting reedbed and the Styan’s Grasshopper Warbler (L. pleskei) inhabiting dwarf laurel forest that is a congener to the endangered Japanese Marsh Warbler (L. pryeri).

We sampled warblers at three sites within Japan, Kamisu (35°51’33”N, 140°38’20”E) along lower Tone River, Ukishima (35°57’N, 140°28’E) and Funako (36°01’N, 140°16’E) along Lake Kasumigaura, and Ohtsukuejima (33°40’N, 130°18’E). At each site, warblers were caught using mist nets in the breeding season of 1996 and 1997. From some of the caught warblers, we collected a small amount of blood by puncturing the brachial vein, and released them after measuring and taking blood samples. Blood smears were prepared by using the method described by Clayton and Moore (1997) and were air-dried and fixed in 100% ethanol. The blood smears were stained using Giemsa’s stain. The presence of blood parasites was determined for each blood smear by examining 100 randomly selected fields under a 100x oil immersed objective (see Bennett et al. 1995 for details).

A total of 252 individuals belonging to five warbler species were examined for the prevalence of blood parasites. Only 2 (0.8%) individuals of the Great Reed Warbler were infected with Plasmodium sp. (Table 1). Because only early developing gametocytes were found, the blood parasites could not be identified to specific level.

Between 1965 and 1971, of 425 individuals examined belonging to 27 bird species from Tsunoshima island, Yamaguchi Prefecture (34°21’N, 130°51’E), 53 (12%) were infected with a blood parasite (McClure et al. 1978). On this island, three species of Phylloscopus warblers were examined. Twenty-two Crowned Willow Warblers (P. coronatus) were free of blood parasites. Only one of 52 individuals examined of the Arctic Warblers (P. borealis) and one of 27 individuals examined of the Pale-legged Willow Warblers (P. borealoides) were infected with a blood parasite from this area.

The present study and previous reports (McClure et al. 1978; Sodhi et al. 1996; Sodhi et al. 1999) show that in general the blood parasite prevalence is low in warbler and bunting species in Japan. Both migratory and resident species had low blood parasite prevalence (Table 1, Sodhi et al. 1999). It is unclear what the possible mechanisms are that help birds to maintain a relatively low prevalence of blood parasites in this region. Low prevalence of blood parasites found...
by us may be due to several reasons such as the lack of a suitable arthropod vector (e.g. mosquitoes), host specificity in available arthropod vector, and/or lack of blood parasite susceptibility. It is also possible that the examined birds had latent infections that are difficult to detect. Species of avian *Plasmodium* have much broader host specificity than *Haemoproteus* or *Leucocytozoon* and may infect coexisting species beyond avian families (Atkinson & Van Riper 1991). From a conservation perspective, it is probably much easier for maintaining the local population of endangered Japanese Marsh Warbler and vulnerable Japanese Reed bunting because the coexisting species have less prevalence of blood parasites.

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**REFERENCES**


### Table 1. The number of individuals sampled for the presence of blood parasites in five species of warblers in Japan.

<table>
<thead>
<tr>
<th></th>
<th>Kamisu Ibaraki</th>
<th>Lake Kasumigaura Ibaraki</th>
<th>Ohtsukue-jima Fukuoka</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Resident species</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fan-tailed Warbler, <em>Cisticola juncidis</em></td>
<td>2(1)</td>
<td>12(10)</td>
<td>2</td>
</tr>
<tr>
<td>Japanese Marsh Warbler, <em>Locustella pryeri</em></td>
<td>26(4)</td>
<td>5(7)</td>
<td>8</td>
</tr>
<tr>
<td><strong>Migratory species (Summer visitor)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Styan’s Grasshopper Warbler, <em>L. pleskei</em></td>
<td>–</td>
<td>–</td>
<td>1</td>
</tr>
<tr>
<td>Great Reed Warbler, <em>Acrocephalus arundinaceus</em></td>
<td>10(2)</td>
<td>20(30)</td>
<td>19</td>
</tr>
</tbody>
</table>

The number of individuals infected is indicated in parentheses. F=female, M=male, and U=unknown sex.


McClure HE, Poonsawad P, Greiner EC & Laird M (1978) *Haematozoa in the birds of eastern and southern Asia*. Memorial University of Newfoundland, Newfoundland.


