

Berger, J. M. et al.  
1968

## BEHAVIOR OF HAND-RAISED KIRTLAND'S WARBLERS

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Most of the wood warblers (Parulidae) of North America range widely either across the continent or in its eastern or western segments. Only a few such as the Kirtland's Warbler (*Dendroica kirtlandii*) live in relatively restricted areas. Not surprisingly, the Kirtland's Warbler (Plate I) is on the list of rare and endangered species of North American birds. Censuses conducted in 1951 and 1961 revealed that the total breeding population of the species was about 1,000 birds (Mayfield, 1953, 1962), all on the sandy jack pine (*Pinus banksiana*) plains in the upper part of Michigan's lower peninsula. Here birds find conditions suitable for nesting when the jack pines are from three to about 25 feet high. It is only in trees of this size that the pattern of thickets and open spaces and the ground cover appear to provide the necessary ecological requirements for breeding.

### Early Records of Nesting and Raising Captive Birds

It was not until 1903 that E. H. Frothingham and T. G. Gale (Holden, 1964) discovered the nesting grounds of Kirtland's Warbler. Norman A. Wood found the first nest on 8 July 1903, and the second nest the following day (Wood, 1904; Holden, 1960). Additional nests were found in the following years, but the first important life history study was written by Leopold (1924).

In his unpublished field journal, Norman A. Wood recorded that he took the nestling Kirtland's Warblers from his first nest on 11 July 1903 and kept them "alive by feeding them House flies until the 13th, when I found them dead, and I made them up into skins." Wood (1904) collected his second nest on 14 July 1903, stating: "I brought the 5 young back alive, although I had to Chloroform and preserve them the next day."

Josselyn Van Tyne first visited the nesting grounds of Kirtland's Warbler in 1930 and continued his studies on this species until his untimely death in 1957 (Mayfield, 1960; Berger and Radabaugh, 1968).

Van Tyne had tried at least three times (1939, 1948, 1955) to hand-raise nestling Kirtland's Warblers, but without success. I know of no records on his experiences with the young warblers. When Van Tyne and I were on his study area near Mack Lake in Oscoda County, Michigan, during the first week of July 1956, he asked me to try raising a nestling Kirtland's Warbler. On 23 July 1956, I collected one of four nestlings from a nest I had found with four eggs on 3 July. It died five weeks later on 31 August, presumably from asphyxiation, perhaps complicated by fright (Berger, 1965).

