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Nesting and Brood Rearing Habitat of The Upland Sandpiper

JOHN C. DORIO,* and ALFRED H. GREWE**

ABSTRACT — The upland sandpiper population breeding in Morrison county in central Minnesota was studied in 1975 and 1976. Nests were found in old fields (73 percent), pastures (20 percent), and in a sedge-grass meadow (7 percent). Most nests were discovered in vegetation 22.5 to 35.0 cm tall and on the average were 13.2 m. from an aspen or willow edge. Seven grasses and 23 forbs made up the plant species composition at 14 nest-sites. Brood rearing areas were old fields and over-grazed pastures. Upland sandpipers prefer to feed in vegetation that does not exceed 10 cm.

The upland sandpiper, *Bartramia longicauda* (Bechstein) was formerly a common breeding bird in the prairie regions of Minnesota and remained abundant until 1870. Between 1895 and 1900 it was extirpated from the southern portion of the state (Roberts 1932). Introduction of the steel plow to facilitate cultivation of the prairie was a factor in the disappearance of this sandpiper from many of its former breeding areas. Roberts (1932) wrote that loss of habitat and market hunters were responsible for the decline. He noted a gradual increase beginning in 1920 that continued through 1931. The enactment of the Migratory Birds Convention Act in 1916 provided full protection from hunting, and probably contributed to the increase. Presently, this species breeds throughout most of the state; but is scarce in the forested counties of the northeast (Green and Janssen 1975).

Increased worldwide demand for food has generated higher prices for corn and small grains, so marginal lands are being cultivated in order to take advantage of the situation. The sandy soils in central Morrison county are productive if there is sufficient precipitation during the growing season. Farmers in the area have generally relied on rainfall, but recently irrigation has been introduced. During 1976, the area experienced a drought, and this stimulated a marked increase in use of sprinkler systems.

This study of the upland sandpiper was initiated in 1975 and continued through 1976. Data were collected on the nesting and brood rearing ecology of this bird in central Morrison county, and contributed to author Dorio's M.S. thesis.

The objectives of this study were to determine the size and distribution of the breeding population, length of the pair-bond, philopatry of adults and juveniles, nesting success, brood mortality, and especially the preferences in nesting and brood rearing habitat. This paper deals with the latter two aspects of the study.

Watershed study area

The study area is part of the Mississippi-Sauk watershed unit. It is approximately 11.2 km southeast of Little Falls

and 3.2 km northeast of Royalton. The area is 31.2 km² of which 640 ha was intensively studied.

The area is a mosaic of marshes (330 ha), upland woods (66ha), pastures (37ha), sedge-grass meadow (30 ha), with cultivated and old fields comprising the remainder (177 ha).

Nesting habitat characteristics

Nest sites appeared to be restricted to marginal lands. Fifteen nests were discovered during this two-year study. Eleven nests (73 percent) were in old fields; three (20 percent) in pastures, and one (7 percent) in a sedge-grass meadow. Nesting habitat comprised only 13 percent of the 640 ha study area. The old field habitat consisted of two fields comprising a total of 51.2 ha in 1975 and 28.0 ha in 1976. Pastures included 25.6 ha and the sedge-grass meadow consisted of 30.0 ha.

Nesting habitat selection by upland sandpipers indicates that appearance characteristics of the cover rather than species composition are important. Hayfields, pastures, and idle fields are used by the birds in Wisconsin (Buss and Hawkins 1939, Ailes 1976); grasslands composed of native and introduced species are utilized in North Dakota (Kirsch and Higgins 1976); and in northwestern Minnesota, most nesting cover is in dead vegetation from the previous year (Lindmeier 1960).

At the time of discovery, 12 nests were in vegetation 22.5 to 35.0 cm tall; two were in dead matted vegetation. Every nest contained a four-egg clutch. Vegetation height at the

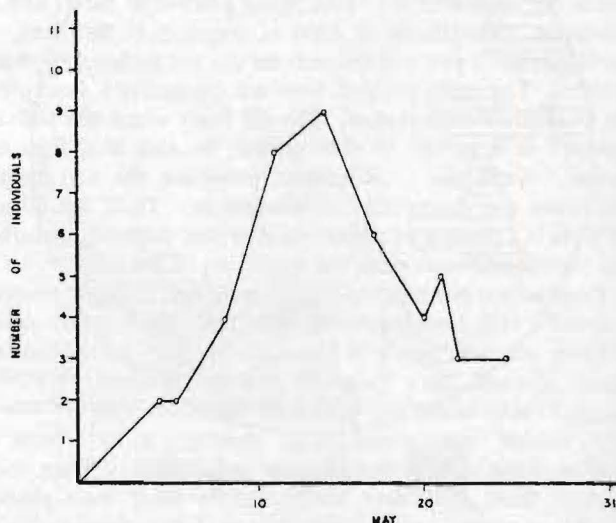


Figure 1 — Pasture use by upland sandpipers for feeding during May 1976.

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Photo A — Day-old sandpiper brood chicks. Note the leg band marker on bird in the foreground.

time of nest initiation is not known. Most nests in other studies were found in vegetation not exceeding 53 cm (Lindmeier 1960, Ailes 1976, Kirsch and Higgins 1976).

All nests located were near an edge. This may have been due to the small total area and the relatively large amount of edge on the study areas. Nests were in close proximity to either willow or aspen. The distance, to nearest tree or shrub varied from 6.0 to 23.4 m (av. 13.2 m).

The plant species composition of 14 nest sites consisted of 7 grasses and 23 forbs. A square meter quadrant of vegetation at the nest site was analyzed. The percent of cover, litter, and bare ground were recorded as well as the vegetation height. Canada bluegrass (*Poa compressa*), timothy (*Phleum pratense*), and quackgrass (*Agropyron repens*) were the most dominant grasses and yarrow (*Achillea Millefolium*) and goldenrod (*Solidago sp.*) the most dominant forbs present on the nest sites sampled (Table 1). Smooth brome grass

Because of increased corn planting, old field acreage decreased from 51.2 ha in 1975 to 28.0 ha in 1976, but the total nesting habitat did not decrease because the pasture area had not been included in the study during 1975. Five

(*Bromus inermis*) was the dominant on the pasture nest site.

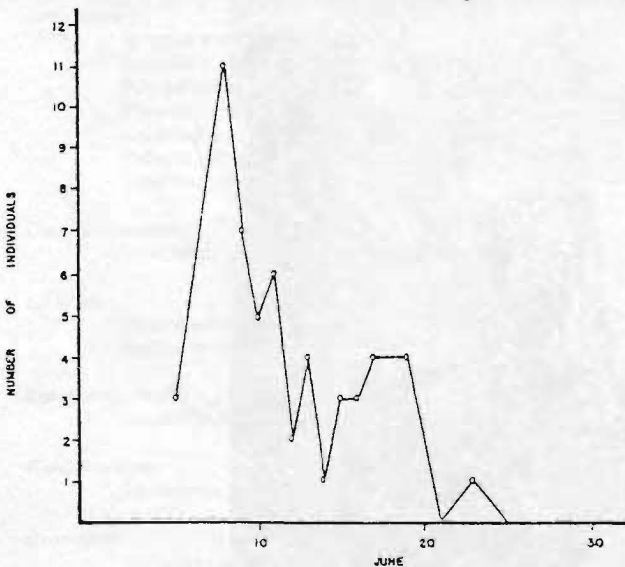


Figure 2 — Pasture use by upland sandpipers for feeding during June 1976.

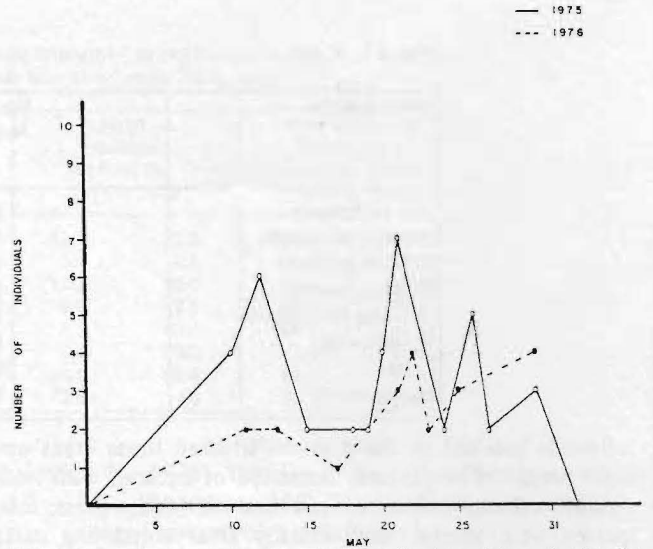


Figure 3 — Sedge-grass meadow use by upland sandpipers for feeding during May 1975-1976.

nests were found each year in the old field habitat. A sixth nest found in 1976 was determined a re-nest. Nests were in closer proximity to each other in 1976 because of the reduction in nesting area. In 1975, three nests averaged 205.5 m apart; in 1976 the distances between four nests averaged 46.8 m.

Densities of Canada bluegrass were noticeably lower in 1976. The cool season grasses were dormant due to the low precipitation that year. In 1976, 2.3 cm of rain was recorded in May, whereas in 1975, 7.5 cm fell. All six nest-sites (100 percent) in 1975 contained Canada bluegrass (Table 2), but in 1976 only two (28.6 percent) of seven nest sites sampled had this grass present (Table 2). Three of eight nests (37 percent) found during 1976 were destroyed by predators. The lower grass densities probably contributed to the increased predation in 1976.

Vegetation of brood rearing areas

Broods remained in the natal areas during the pre-flight period. Areas utilized were old fields and over-grazed pastures. The dominant grasses in the old fields were Canada bluegrass, timothy and quackgrass; the dominant forbs were green sage (*Artemisia campestris*), horseweed (*Conyza canadensis*), yarrow, and goldenrod. Broods hatched in the old fields were associated with portions containing green sage and wind eroded areas known as "blowouts". The blowouts provided some open areas with low densities of vegetation that provided some of the cover type preferred by feeding sandpipers. Both adults and young feed on insects and prefer to feed in vegetation up to 10 cm high. The vegetation was over 10 cm high at hatching time in the old fields. No nests were found where green sage was dominant, but one brood, accompanied by marked adults, was captured in this cover type within four days after hatching 495 m east of the nest site. In 1975, these blowouts were leveled by bulldozer and planted with corn. This 16 ha cornfield eliminated almost half of the green sage feeding-foraging area.

The corn acreage increased to 32 ha in 1976. This increase in tillage was due to dry spring conditions which permitted plowing of marginal land and use of irrigation. Most of the brood rearing area was eliminated. One marked brood moved from its nest site to the last remaining green sage area near the edge of a cornfield, a distance of at least 297 m, in two days. Other broods also were found near this edge.

Table 1. Cover composition at 14 upland sandpiper nest sites in Morrison County, 1975-1976.

Plant Species	No. of Nests	Mean Frequency at Nest (%)	& of Nests with Species/Cover Condition Present
Poa compressa	8	37.5	51.5
Agropyron repens	5	6.8	35.7
Phleum pratense	6	15.1	42.9
Bromus inermis	2	50.0	14.3
Achillea Millefolium	5	4.6	35.7
Solidago sp.	5	15.0	35.7
Litter	10	25.2	71.4
bare ground	5	12.0	35.7

Broods hatched in the pastures utilized those areas until flight stage. The pastures consisted of upland, with hoary alyssum (*Berteroa incana*) and smooth brome grass, interspersed with several small marshy areas containing cattail (*Typha sp.*) and sedges (*Carex sp.*). During the drought in 1976 these areas became dry and were used for escape cover by the broods. Only short vegetation was available for foraging in these over-grazed pastures.

Land utilization by sandpipers

Land use by upland sandpipers varied throughout the breeding season. Vegetation height determined the length of time a field was utilized. Sandpipers (n=237) were seen feeding in over-grazed pastures (54 percent), sedge-grass meadows (32 percent) and plowed-seeded fields (14 percent). Plowed-seeded fields were used by the first arrivals. Over-grazed pastures were used during May and June and the sedge-grass meadow only during May.

The number of sandpipers utilizing the pastures peaked on 14 May and decreased until a low was reached on 22 May (Fig. 1). These peak and valley periods coincided with the egg-laying period and the start of incubation. A second decline in pasture use started on 9 June, just prior to the peak hatching date of 10 June, and continued until 25 June (Fig. 2). After this date, no sandpipers were seen in the pastures.

The sedge-grass meadow was observed during both years. This meadow is annually mowed for hay. Sedges, timothy and Canada bluegrass are the major species present. Sandpiper use of the meadow appeared to increase just prior to the egg-laying period with a decline at the beginning of the incubation period (Fig. 3). Use of the meadow varied after incubation began, but after 30 May sandpipers abandoned it as a feeding area. The vegetation height at this time was over 30.0 cm high. The peaks and declines were similar for both years in this cover type, but the number of sandpipers using

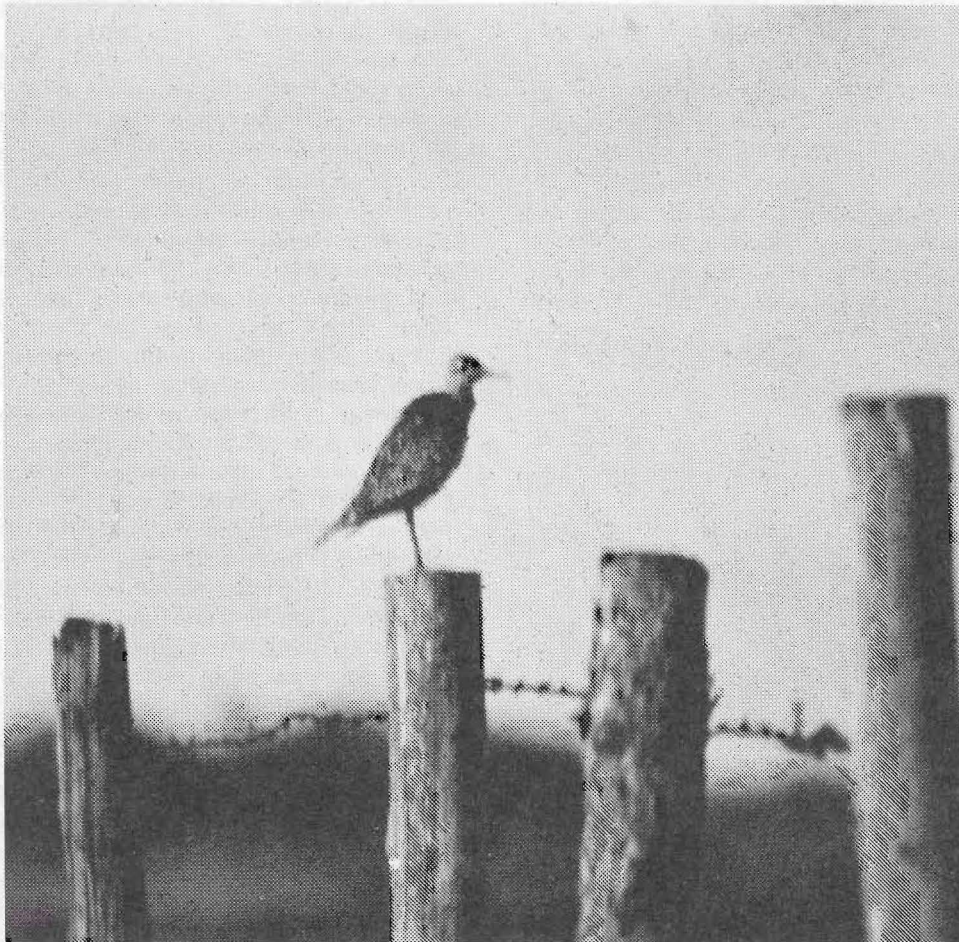


Photo B — An adult upland sandpiper surveys the world from perch on a typical observation/calling post atop a pre-empted fence post.

Table 2. Cover composition at six upland sandpiper nest sites in Morrison County, 1975, 1976.

Plant Species	No. of Nests		Mean Frequency at Nest (%)		% of Nests with Species/Cover Condition Present	
	1975 - 1976		1975 - 1976		1975 - 1976	
<i>Poa compressa</i>	6	2	42.5	22.5	100.0	28.6
<i>Agropyron repens</i>	3	2	5.6	8.5	50.0	28.6
<i>Phleum pratense</i>	4	2	17.7	10.0	66.7	28.6
<i>Achillea Millefolium</i>	3	2	6.0	3.0	50.0	28.6
<i>Solidago sp.</i>	4	1	8.7	40.0	66.7	14.3
<i>Bromus inermis</i>	0	1	0	90.0	0	14.3
Litter	5	5	24.0	26.4	83.3	83.3
bare ground	2	2	7.5	7.5	33.3	28.6

the meadow was greater in 1975.

More sandpipers used the pasture for feeding than any other cover type. Cattle constantly cropped the grass, thereby extending the availability of preferred feeding habitat. Evidently, upland sandpiper adults are more successful in finding insects in low vegetation and possibly the added visibility may also account for the preference of low cover types. The decline in individuals using the pasture after the peak hatching dates indicates that adults remained where their broods hatched. Only birds with broods hatched in the pasture area remained in the pasture area.

Late summer feeding areas

All broods were gone from their natal areas by 26 July. Upland sandpipers (n=26) used mowed red clover fields for feeding in late summer. This cover type was utilized in 1976 between 24 July and 2 August at which time the vegetation height varied from 2.5 to 15.0 cm.

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APPENDIX

Detailed List of Plant Species from 14 Upland Sandpiper Nest Sites

Scientific Designation

Equisetaceae

Equisetum sp.

Gramineae

Bromus inermis Leyss.
Bromus Kalmii Gray.
Poa compressa L.
Agopyron repens (L.) Beauv.
Calamagrostis canadensis (Michx.) Beauv.
Phleum pratense L.
Sorghastrum nutans (L.) Nash.

Commelinaceae

Tradescantia occidentalis (Britt.) Smyth.

Liliaceae

Lilium superbum L.
Smilax herbacea L.

Polygonaceae

Rumex Acetosella L.

Ranunculaceae

Thalictrum dasycarpum Fisch. & Ave-Lall.

Cruciferae

Berteroa incana (L.) DC.

Rosaceae

Fragaria sp.
Rosa sp.

Fabaceae

Trifolium pratense L.
Vicia americana Muhl.

Umbelliferae

Zizia aurea (L.) Koch.

Labiatae

Agastache Foeniculum (Pursh) Kuntze.

Scrophulariaceae

Linaria vulgaris Hill.
Pedicularis canadensis L.

Rubiaceae

Houstonia longifolia Gaertn.

Campanulaceae

Campanula rotundifolia L.

Compositae

Rudbeckia hirta L.
Achillea Millefolium L.
Artemisia ludoviciana Nutt.
Artemisia campestris L.
Solidago spp.
Solidago gigantea Ait.
Erigeron sp.
Krigia biflora (Walt.) Blake.
Tragopogon pratensis L.