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ACCURACY OF AGING DUCK BROODS IN THE FIELD

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Abstract.—The ability of a crew consisting of a permanent biologist and technician, seasonal technicians, and student interns to age ducklings accurately in the field was tested by comparing known ages of ducklings to ages estimated using a brood-classification system. Crew members assigned Mallard (*Anas platyrhynchos*) and Blue-winged Teal (*Anas discors*) ducklings to one of seven age subclasses (Ia, Ib, Ic, IIa, IIb, IIc, and III) based upon duckling plumage characteristics. There was no difference between the known and estimated ages of ducklings in 27 pooled mallard broods ($t = 0.28$, df = 26, $P = 0.78$) and in 78 pooled blue-winged teal broods ($t = 1.19$, df = 75, $P = 0.24$) based upon the midpoint of the age subclasses. However, there was a tendancy to misclassify some individual broods.

PRESICIÓN PARA DETERMINAR LA EDAD DE PATITOS EN EL CAMPO

Sinopsis.—La habilidad de biólogos, técnicos, técnicos temporales y estudiantes, para determinar con presición la edad de patitos en el campo fue puesta apruebas al compararse el estimado de la edad de estas aves utilizando un sistema de clasificación con la edad previamente conocida de los grupo de estas aves. Los diferentes grupos de personas le asignaron a camadas de patitos de *Anas platyrhynchos* y *A. discors* una clasificación de edad de grupos de 1 a 7 subclases, basándose en las características del plumaje de éstos. No hubo diferencias entre la edad conocida y la estimada de 27 camadas de *Anas platyrhynchos* ($t = 0.28$, 26 gl, $P = 0.78$) y de 78 de *A. discors* ($t = 1.19$, 75 gl, $P = 0.24$) basándose en el punto medio de la edad de las diferentes subclases. No obstante, hubo la tendencia a clasificar erroneamente algunas grupos de patitos particulares.

Recognizing the need to estimate accurately the age of duck broods in the field, Earl (1950), Low (1945), and Yocum (1950) aged broods based upon duckling plumage development. In 1947, the U.S. Fish and Wildlife Service began using three brood age classes (I, II, and III) based upon duckling plumage.

Southwick (1953) thought that three age classes were too general and proposed five groupings by subdividing Classes I and II into Subclasses Ia and Ib and Subclasses IIa and IIb. Blankenship et al. (1953) further proposed seven age subclasses (Ia, Ib, Ic, IIa, IIb, IIIa, and IIIb) based on duckling growth rates and feather development. Finally, Gollop and Marshall (1954) suggested seven age subclasses, which included Subclasses Ia, Ib, Ic, IIa, IIb, IIc, and IIIa. They gave an age-span and midpoint (in days) for each subclass by duck species. Their technique has become the primary classification system in use today. The goal of this study was to test the ability of Wisconsin Department of Natural Resources (WDNR) personnel to accurately age Mallard and Blue-winged Teal ducklings using Gollop and Marshall's (1954) "plumage-appearance" age subclasses.

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METHODS

The study area was located in the prairie pothole region of northwest Wisconsin. The 130,000-ha study area in St. Croix and southern Polk counties has been described by Evrard and Lillie (1987). Briefly, topography is level to gently sloping with sandy loam soils supporting dairy and livestock farms interspersed with numerous small wetlands and scattered small woodlots. State and federal wildlife management and waterfowl production areas total 2900 ha within the study area.

During 1982–1991, WDNR personnel captured 328 adult female Mallard and Blue-winged Teal on their nests with hand and mist nets (Bacon and Evrard 1990), usually several days prior to hatch. Captured females were marked with standard U.S. Fish and Wildlife Service leg bands and color-coded nasal saddles similar to those described by Greenwood (1977). Nests were revisited on the day of hatch to determine fate and to capture and mark ducklings.

Age classes of duck broods observed in the field with binoculars and spotting scopes were estimated by WDNR personnel using the classification system of Gollop and Marshall (1954). Data from broods where visibility was difficult were not used in this analysis. These personnel did not know the actual ages of the observed broods. The actual age (in days) of ducklings accompanied by marked females and for which the hatch date was known was later determined by subtracting the known hatch date from the date of the brood observation.

During the 10-yr study, the WDNR crew consisted of 1 biologist, 1 technician, 9 seasonal technicians, and 23 student interns. All personnel were provided copies of Gollop and Marshall's (1954) brood classification chart for field reference and were instructed in its use. Ducklings in the field were aged by comparing their plumage development patterns to those depicted in the illustrated classification chart.

I used the Student's *t*-test and the Wilcoxon's signed rank test in the Epistat statistical package (Gustafson 1984) to compare differences between known duckling ages and duckling ages estimated using the technique of Gollop and Marshall (1954).

RESULTS AND DISCUSSION

There was no difference ($t = 0.28$, df = 26, $P = 0.78$) between the mean estimated age calculated using Gollop and Marshall's (1954) age-class midpoints and the mean actual age of Mallard ducklings. The crew correctly classified 62% of the 27 Mallard broods observed. They had difficulty in correctly classifying Class I (pooled subclasses Ia, Ib, and Ic) broods ($t = 2.99$, df = 12, $P = 0.01$), but not Class II (pooled subclasses IIa, IIb, and IIc) broods ($t = 0.63$, df = 10, $P = 0.54$). The mean estimated age of pooled Class I broods was 2.9 d greater than the mean actual age. There were too few Subclass IIIa broods ($n = 3$) to allow comparison. All 12 misclassified Mallard broods were within one age class of the actual class.

Although only 36% of the 78 Blue-winged Teal broods observed were correctly classified, there was no difference ($t = 1.19$, df = 75, $P = 0.24$) between the mean actual ages and mean estimated ages of the ducklings. There were no differences between the estimated and actual ages for pooled Class I broods ($t = 1.67$, df = 29, $P = 0.11$) and pooled Class II broods ($t = 0.41$, df = 41, $P = 0.68$). Of the 49 misclassified broods, 39 were classified within one age class of the actual age, nine were with two age classes, and one was within three age class.

When data for all broods of both species were pooled, estimated ages did not tend to be different from actual ages (Wilcoxon's $t = 0.06$, df = 101, $P = 0.95$). The average differences between estimated and actual ages were −0.46 d for Mallard ducklings and −0.40 d for Blue-winged Teal ducklings.

There was a difference of less than 1 d between the mean actual and estimated ages for both the Mallard and Blue-winged Teal ducklings. Thus, personnel were able to accurately apply Gollop and Marshall's (1954) technique for estimating the mean age of pooled samples of duck broods in the field. However, there were errors made in classifying individual broods. The ages of Mallard ducklings from Class I broods tended to be over-estimated. Our data suggest that mean brood ages, estimated from this method, can be backdated to construct accurate nest initiation and hatching curves.

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