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EFFECTS OF DISKING VERSUS FEED PATCH MANAGEMENT ON NORTHERN BOBWHITE BROOD HABITAT AND HUNTING SUCCESS

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ABSTRACT

More than 60 years ago, Herbert Stoddard (1931:376) wrote *"there is little doubt that such methods* [i.e., disking and harrowing] *are more practical for Southeastern quail preserves than artificial plantings, which are costly on a large scale and not always effective."* Incredibly, this statement, and testing it as an hypothesis, has been ignored by the bobwhite research community until the past 10 years. Therefore, we designed a pilot study to compare measures of northern bobwhite (*Colinus virginianus*) brood habitat (vegetation composition and arthropod biomass) and direct measures of hunting success (covey finds per half-day hunt) to test whether feed patches were really necessary for bobwhite habitat management in southern Georgia and northern Florida. We applied experimental treatments (disk only versus feed patch planting) by using shooting courses (150–250 ha each) on 2 southeastern shooting plantations during 1994, 1995 and 1996. Overall, results were equivocal between the feed patch and disking treatments; no consistent pattern or difference in brood habitat composition or hunting success was observed. One factor responsible for this pattern may be the relatively fine-grained scale (only 1–3% of the shooting courses were planted or disked) at which treatments were applied were insufficient to significantly influence bobwhite abundance. Further research using increased amounts of ground disturbance and planting (5%, 10%, 20%, etc.) will be required before the actual need for agricultural plantings can be determined in the context of their efficacy for bobwhite management. One potential result of these findings is that significant cost savings can be realized by disking rather than planting agricultural crop plants because at least 70% of the costs of planting are a function of seed, fertilizer and cultivation, whereas only about 30% are attributed to disking.

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INTRODUCTION

Stoddard (1931:376) wrote *"there is little doubt that such methods* [i.e., disking and harrowing] *are more practical for Southeastern quail preserves than artificial plantings, which are costly on a large scale and not always effective."*

Despite this admonition, widespread use of artificial plantings (i.e., "feed patches") for northern bobwhite habitat management persists throughout the southeastern and midwestern United States. In the midwestern U.S. feed patches may provide winter food for bobwhites, and thus enhance their physiological condition and reduce their need to wander over large areas to find food (Robel et al. 1974). However, in the southeastern U.S. there seems to be a blind acceptance that feed patches are an essential component of successful bobwhite management, despite the widespread lack of data to support this belief (Guthery 1997).

Because of the widespread declines in northern bobwhite populations during the past 3–4 decades (Brennan 1999), economical management techniques are now more important than ever. If researchers can

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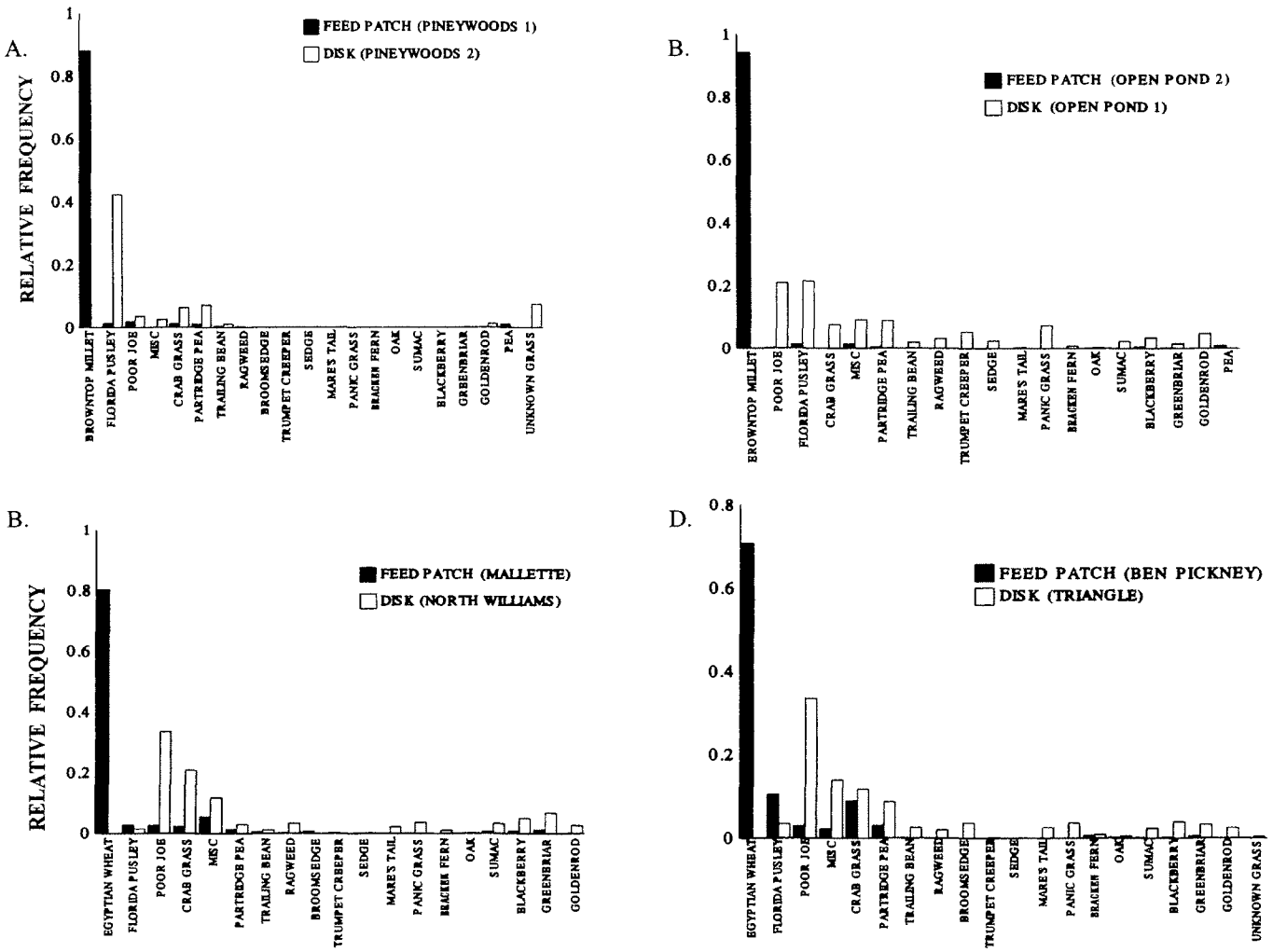

Fig. 1. Frequency of occurrence of plants on feed patch and disked only habitat plots at two plantations in the Tallahassee, FL–Thomasville, GA region. A and B represent one plantation, C and D represent the second property. Data were collected during June, July and August 1995.

demonstrate to managers that there is no net difference between use of disking versus use of feed patch management, then significant cost savings can be realized.

Our objective in this study was to design a preliminary examination to evaluate the short-term effects of disking versus feed patch management on: (1) elements of brood habitat (i.e., vegetation composition and arthropod biomass); and (2) hunting success during the subsequent fall and winter seasons after the management treatments were applied.

METHODS

Sampling Unit

We used 8 shooting courses (4 sets of paired plots with 2 pairs on each of 2 plantations). Shooting courses averaged 150–300 ha each, and were treated as management and hunting units on these properties where each plantation averaged about 1,500 ha. Major activities in the annual cycle of management events on these properties are described in Brennan (1994). Each shooting course had a previously established array of feed patches that ranged in size from 0.5 to approximately 2 acres. Management treatments (disk only versus planting) were assigned at random. Areas assigned to receive the feed patch treatment were planted with Egyptian wheat (at one property) and browntop millet (at the other property). Areas assigned to receive the disk only treatment were disked during April and May, at the same time that the feed patch areas were prepared for planting.

Vegetation and Arthropod Sampling

We estimated the relative frequency of occurrence of plant species present on disked and feed patch areas using a meter square grid placed at 5 meter intervals along 25 meter transects. Thirty 25 meter transects were sampled in feed patch or disked only areas in each shooting course during June, July, and August of 1994 and 1995. Arthropods were sampled using a D-vac suction device along 30 25-meter transects in feed patch and disked only areas in each shooting course, also during June, July, and August of 1994 and 1995. During each sampling period, arthropods were sam-

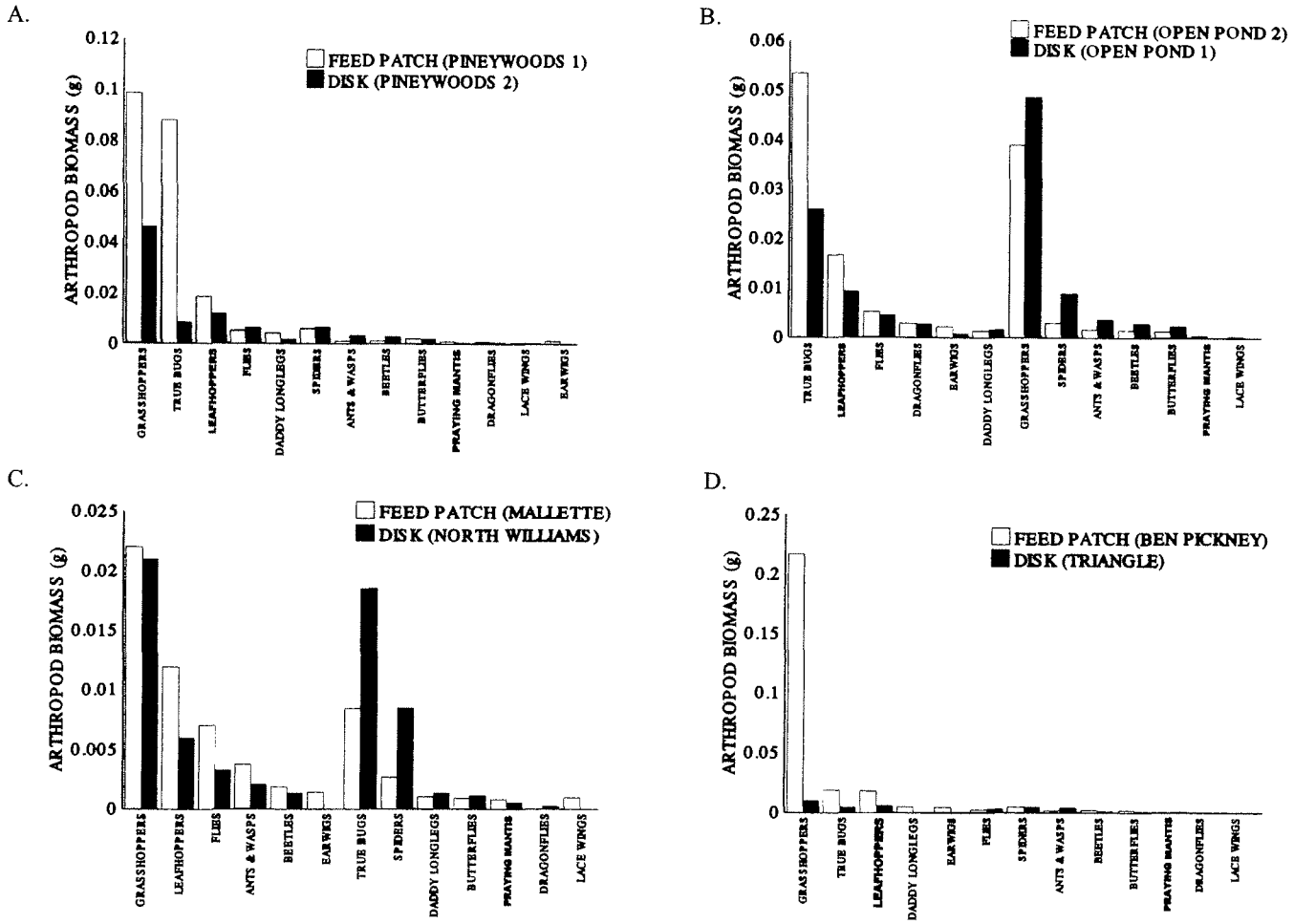

Fig. 2. Arthropod biomass on feed patch and disked only habitat plots at at two plantations in the Tallahassee, FL–Thomasville, GA region. A and B represent one plantation, C and D represent the second property. Data were collected during June, July and August 1995.

pled first. Vegetation data were subsequently collected within 1–24 hours after collecting arthropods.

In the laboratory, arthropods were sorted to Order, dried for >12 hours at 70 degrees Celsius, and weighed to 0.001 grams.

Hunting Success

Bobwhites were hunted with pointing dogs on 2–3 week intervals during the hunting season (December–February). Tallies on number of bobwhite coveys flushed per half-day (4 hours) of hunting were recorded by the plantation owners, managers, or dog handlers. Hunting success data were collected during the 1994, 1995, and 1996 hunting seasons.

RESULTS

Vegetation

Overall, plant species richness was greater on the disked plots than on the feed patch plots at both properties (Figs. 1 and 2). As expected, feed patch plots were dominated by the planted crop plants (i.e., browntop millet at one site, and Egyptian wheat at the other; Fig. 1).

Otherwise, there were only minor differences in the relative abundance of native vegetation between the feed patch plots and the disked plots.

Arthropods

At one plantation, arthropod biomass tended to be greater in the feed patches (Figs. 2a and 2b), except for grasshoppers (Orthoptera). This general pattern was also observed at the second property except that spiders and true bugs (Hemiptera) were more abundant on the disked plots than on the feed patch plots (Figs. 2b and 2c).

In general, the feed patch plots provided relatively rich patches of arthropod foods, compared to the disked only areas.

Hunting

Overall, there was no clear difference in hunting success between either the feed patch or the disked only hunting courses at either property (Fig. 3). When data were averaged across 3 years of the study, the

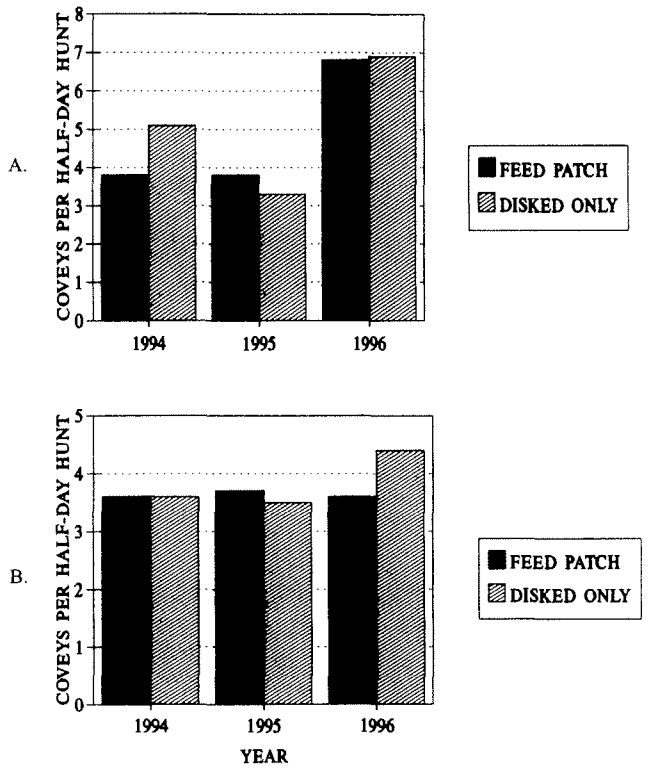

Fig. 3. Northern bobwhite hunting success on the shooting courses used for this study during the 1994, 1995, and 1996 hunting seasons (December through February). One half-day hunt equals approximately 4 hours of hunting effort.

feed patch courses averaged 3.6 coveys per half-day hunt and disked only courses averaged 3.8 coveys per half-day hunt (Fig. 3a). At the second property, feed patch courses averaged 4.8 coveys per half-day hunt and disked only courses averaged 3.8 (Fig. 3b).

DISCUSSION

Stoddard's (1931) assertion that simple disking and harrowing would be more appropriate and economical for northern bobwhite management seems to be supported by the data collected for this study, at least over a short-term (1 to 3 year) period. The increased availability of arthropod biomass on the feed patch plots apparently did not translate into increased northern bobwhite abundance and hence an increase in hunting success.

Evidently, the scale at which the feed patch and disked plots were applied (about 1–3% of the total area of usable habitat on each shooting course) was insufficient with respect to making an overall difference in bobwhite abundance, at least as indicated by hunting success.

Costs of the disked treatments averaged about $60.00 per ha per year, whereas planting feed patches (either millet or Egyptian wheat) cost about $180.00 per ha per year. Thus, >66% management cost savings can be realized by utilizing mechanical soil disturbance without planting seed and using fertilizer. However, further work will be required to determine the long-term effects of substituting disk only management treatments for feed patch planting. Additionally, companion experiments to assess impacts of varying the overall extent of soil disturbance (i.e., 5%, 10%, 20%, etc.) would be useful for examining the impacts of disking versus planting feed patches for northern bobwhite management. Our data also point to the need to consider northern bobwhite management and manipulative field experiments within the context of overall useable habitat space (Guthery 1997) as opposed to the minutiae of small-scale, but relatively costly, management actions.

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