

## **An Evaluation of North Carolina's Free Wildlife Planting Materials Program**

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*Abstract:* The North Carolina Wildlife Resources Commission's (NCWRC) free planting materials program was evaluated using interviews and field inspections. Cooperators were conscientious in planting and caring for the wildlife plots. Seventy percent of the plantings were fertilized. Seventy-four percent of the distributed units of annual seed mix resulted in successful plantings. Poorer success was noted with the perennial mix. Effectiveness of the planting materials in increasing carrying capacity was not determined. Cooperators felt that the plantings benefitted wildlife (96%) and hunting (85%). Concern had been expressed by NCWRC biologists that a preoccupation with food plots prevents landowners from recognizing other habitat problems. However, 46% of the respondents practiced other habitat management techniques. A well established free planting material program can result in successful wildlife food plots; however, the question of how much or how often these plantings benefit wildlife populations remains unanswered.

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Shortly after the North Carolina Wildlife Resources Commission (NCWRC) was formed in 1948, a program to provide free wildlife planting materials to interested landowners was established (Hazel and Hankla 1957). Seed mixtures and seedlings that provide food and cover for small game were developed and made available. Distribution of planting materials was a popular practice in the early history of many state wildlife agencies and was effective in educating landowners to the importance of habitat management.

Most states, however, have reduced the amount of planting materials given, have charged for planting materials, or have stopped distribution altogether. North Carolina has continued to provide free planting materials and is presently annually distributing approximately 200,000 pounds of seed and 4,000 seedlings to about 7,000 cooperators. Cost of production of this material alone is in excess of \$125,000. Added to production cost is on-site delivery of the materials by district biologists.

Exact cost figures on delivery are unknown since this activity is often combined with other activities of the district biologists.

Much debate about the effectiveness of this program has occurred in recent years. Biologists have questioned: 1. the amount delivered versus amount planted ratios; 2. the care with which the material is planted; 3. whether or not the material is effective in increasing carrying capacity of the habitat; and 4. that a preoccupation with food plots often may prevent landowners from recognizing other habitat problems. Because of these questions, the expense of the program, and its popularity among constituents, a survey of cooperators was taken to determine how much of the material was being used properly.

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## Methods

### Seed Mixtures

Both a perennial mixture and an annual mixture (Table 1) distributed by the NCWRC were evaluated. Each mixture is measured in units with enough seed to plant 0.05 ha. One-unit, 4-unit, and 24-unit bags were distributed. Instructions were included with each bag suggesting proper planting and fertilization rates and planting times. Additional advice was provided regarding site selection and other habitat improvements when requested. Included on the application form for the materials was an agreement, signed by the cooperator, to allow inspections of the plantings by Commission personnel.

**Table 1.** Ingredients of the 2 types of NCWRC seed mixes evaluated in this study.

Annual Mix		Perennial Mix	
Component	Percent by Weight	Component	Percent by Weight
Cow pea	25.6	VA-70 Shrub lespedeza	58.0
Yellow soybean	20.9	Wise pea	16.0
Brown-top millet	14.0	Partridge pea	9.0
Laredo soybean	14.0	Rice bean	9.0
Buckwheat	6.9	Laredo soybean	8.0
Egyptian wheat	5.8		
Milo	5.8		
Proso millet	4.1		
German millet	2.9		

## Interviews

A random sample of cooperators was drawn from each of the 9 Wildlife Commission districts based on the proportion of cooperators in each district. From a total of 6,649 cooperators, 204 (3%) were interviewed and questioned concerning 3 broad categories of concern: reasons for planting the wildlife plots, techniques and care in planting, and past history of cooperation. District biologists were provided with questionnaires and detailed instructions for conducting the interviews. Interviews were conducted either in person or by telephone. Up to 5 call-back attempts were made to secure interviews. No attempt was made to correct the results for non-response bias.

## Field Evaluations

Each biologist was assigned a certain number of field evaluations and instructed to ask for appointments for field evaluations at the conclusion of each interview. Once the needed number of evaluations was obtained, the remaining interviews were conducted without reference to a field evaluation.

Arrangements were made with 107 cooperators (1.6%) to inspect their wildlife plots that were planted using the NCWRC's planting materials. Inspections included: 1) measuring the area of the plot; 2) randomly locating 3 1X2-m sample areas within the plot; 3) estimating percent coverage of the various seed mixture components within the sample areas (Daubenmire 1959); 4) counting stems of VA-70 shrub lespedeza (*Lespedeza japonica*) seedlings within the sample areas; 5) subjectively judging whether or not food or cover was potentially limiting in the area of the plot; 6) determining number of general habitat types (i.e., field, woodland, hedgerow, etc.) adjacent to the plot; and 7) rating browse damage as heavy, moderate, or light.

Each plot was scored on the basis of the factors described above. The scoring procedure used for annual and perennial plots was slightly different. For annual plots a score of 0 was given for plots in which no 1 component in the mix exceeded a coverage of 5% and no additional points were added for other factors. One point was given for annual plots with between 5% and 50% coverage of any 1 component, and 2 points were added to the score if coverage class of any 1 component exceeded 50%. Perennial plots scored 0 if the number of stems of VA-70 did not average 2 or above per sample area and, again, no additional points were added for other factors. Perennial plots were given 1 point for an average of 2 to 10 stems per sample area and were given 2 points for plots averaging greater than 10 stems per sample area.

The remainder of the scoring procedure was the same for both types of plots. Each plot was judged by the biologist as to whether food or cover was a limiting factor. To overcome part of the problem associated with the subjective nature of judging whether or food or cover was limiting, all biologists participating in the survey took part in a training exercise in the field to discuss how they were to judge these factors. One point was added to the score (except a score of 0) if, in the absence of the plot, food would have been considered a limiting factor; 1 point was

added if adequate escape cover was available other than in the plot itself; and 1 point was added if there was more than 1 habitat type bordering the plot. Plots were rated "low value" if the total score was  $\leq 1$ , "medium value" if  $> 1$  and  $\leq 3$ , and "high value" if the score totaled  $> 3$ .

Total areas actually planted in each type plot were compared with areas that could have been planted using figures based on the total number of units delivered to sampled cooperators and suggested planting rates. Only those plots scoring a high or medium value were included in the totals for actual area planted.

## Results and Discussion

### Interviews

Seventy-two percent of the respondents planted the material to improve their hunting. In response to a question asking the species (1 or more) which the planting was intended to benefit, 62% listed quail and 14% listed rabbit. While the material was designed to be planted primarily for small game, 49% of the respondents listed deer as 1 of the animals they wished the planting to benefit. Wildlife in general was listed by 20% of the respondents. Other species (i.e. grouse, turkey, songbirds) were listed by 17% of the respondents.

Concerning techniques and care of plantings, cooperators were generally more conscientious than might be expected. Respondents claimed to have planted 78% of the annual and 74% of the perennial that was delivered to them and 85% claim to have planted at least some of the material furnished. Although there was some waffling when, at the conclusion of the interview, respondents were asked for on-site inspections, this was not a common problem. Respondents claimed to have fertilized 70% of the plots. Thirty-five percent mixed other seed with the NCWRC mixtures. Most mixing involved adding soybeans to the annual mix.

One of the benefits often claimed for the planting material program is that it allows the opportunity for direct contact between the biologist and the landowner and encourages technical assistance. Thirty percent of the respondents stated that they talked with a representative of the NCWRC about location of their food plots and/or other practices to benefit wildlife on their farm. When asked about wildlife management practices other than food plots, 46% stated they also used other practices. Among those mentioned were timber management (thinnings, control burning), mowing strips, leaving crop residue, disking, maintaining field borders, and planting cover crops.

Because perennial plantings do not come into full production until their third year, and because hunters often do not judge the effectiveness of any of their plantings until after a hunting season has passed, respondents were questioned about their past history of planting the NCWRC's mixes. Seventy-three percent were repeat cooperators. When asked if they felt that the plantings they had made in the past had benefited wildlife, 96% felt that they had and 85% believed the plantings had improved their hunting.

Of those who had made plantings before, 49% had planted perennial mix. Seventy-three percent indicated that at least some of these plantings were still in existence. Average age of the cooperator's oldest perennial planting was 8.5 years with a maximum age of 25 years. Because the perennial mix was first distributed in the early 1970s, many of these older plantings referred to were started from bicolor lespedeza (*Lespedeza bicolor*) seedlings distributed by the NCWRC rather than the seed mixture.

#### Field Evaluations

Mean size of the plots was 0.14 ha and 0.07 ha for annual and perennial plots respectively. Plot ratings for both plots combined showed 29% as low value, 46% as medium value, and 25% as high value plots. Results show a remarkably high success rate for annual plantings (74.2%) and much lower success rate for perennial plantings (29.7%) (Table 2).

When hectares of plots planted by those cooperators receiving 8 units and those receiving 4 units were compared (Table 3), the mean number of hectares planted was essentially the same for both type cooperators. If seeding rates were doubled for those receiving 8 units as would be indicated, their plots might be expected to receive higher scores due to denser stands. In fact, the percent of low value plots was greater for the 8-unit cooperators ( $\chi^2 = 6.18$ ,  $P < 0.05$ ).

Evaluations of coverage classes of the various components of the annual mix indicated that no 1 species of plant dominated the plantings in all situations. The dominant species varied depending on soil type, region, weather, etc. This is a desirable characteristic of a seed mixture in that the planting succeeds even if conditions are not favorable for the growth of 1 particular component.

**Table 2.** Percent of NCWRC planting material resulting in successful plots.<sup>a</sup>

Seed Mix	Potential Area Planted (ha)	Area Successfully Planted (ha)	Successfully Planted (%)
Annual	43.85	32.55	74.2
Perennial	8.95	2.66	29.7

<sup>a</sup>Only those plots scoring a medium or high value were considered successful.

**Table 3.** A comparison of the number of hectares and the percentage of low value plots for NCWRC planting materials cooperators planting 4 an 8 units.

Type Cooperator	N	Mean Planting Size (ha)	Low-value Plots (%)
4 unit	50	0.33	14
8 unit	19	0.32	46

If the plots are to be used as food source for seed-eating birds, there is an apparent conflict with browsing species. Heavy browse damage, virtually eliminating legumes, was observed on 14% of the plots. Moderate or light damage was observed on an additional 36% of the plots inspected. Deer accounted for almost 90% of the damage. Rabbit or a combination of rabbit and deer accounted for the remainder.

### Conclusions

Quality of participation in North Carolina's seed program is remarkably high. The reason for this is believed to be that the program is long-established with a high percentage of repeat cooperators. The program has been successful in focusing emphasis on habitat improvements rather than on less sound wildlife management practices. One of the problems of the program is that planting food plots is often seen as the easy answer to plentiful game, resulting in other habitat-related problems being overlooked. However, it was encouraging to observe that almost half of the cooperators are practicing additional types of habitat management.

The question of whether or not this material is effective in increasing carrying capacity of the habitat is one that remains unanswered. Murray (1958) concluded that food plantings on corn and peanut land in north Florida did not materially affect quail populations. Tobler and Lewis (1980), in Oklahoma, found disked strips contained more winter food than food plots. In the minds of the cooperators, however, there is little doubt of the program's effectiveness. The real answer, of course, is that limiting factors vary, and therefore the effectiveness of food plots varies from farm to farm. Because of the difficulty and expense of research needed to determine the limiting factors of a wildlife population, it may never be really known how often the plantings are truly beneficial.

Problems were detected with the success rates of the perennial mix. Hazel and Hankla (1957) reported 74% success rate for establishing perennial plots from seedlings while this study showed a success rate using the perennial seed mix of only 29.7%. The increased cost of manual labor makes switching back to production of seedlings impractical. One problem in achieving higher success rates with the seed mix may be that VA-70 seed should be planted by 15 April in North Carolina (Anonymous 1980). However, often the seed is not even delivered to the cooperators by this date. Problems with receiving and processing applications to avoid repeated delivery trips make resolution of this problem difficult. In addition, many cooperators do not wish to be bothered with wildlife plantings until after their other crops are in the field. Finally, inoculation of VA-70 shrub lespedeza may improve success rates of these perennial plots.

Preliminary indications are that there may be a saturation point where increasing the number of units of seed to a cooperator does not increase the quantity of wildlife food plots and in fact may decrease their quality. Some biases exist in these data in that those cooperators, receiving larger numbers of units, were often deer hunt clubs intending to use the material for a source of browse.

**Literature Cited**

- Anonymous. 1980. VA-70 shrub lespedeza. U.S. Dep. Agric., Soil Conserv. Serv. Program Aid 1277. U.S. Gov. Printing Off., Washington, DC 6pp.
- Daubenmire, R. 1959. A canopy coverage method of vegetational analysis. *Northwest. Sci.* 33:43-61.
- Hazel, R. B. and D. J. Hankla. 1957. Nine years of progress in farm game management in North Carolina, 1948-1957. *Proc. Annu. Conf. Southeast. Assoc. Game and Fish Comm.* 11:20-34.
- Murray, R. W. 1958. The effect of food plantings, climatic conditions and land use practices upon the quail population on an experimental area in Northwest Florida. *Proc. Annu. Conf. Southeast. Assoc. Game and Fish Comm.* 12:269-274.
- Tobler, S. L. and J. C. Lewis. 1980. Bobwhite foods in six Oklahoma habitats. *Proc. Annu. Conf. Southeast. Assoc. Fish and Wildl. Agencies.* 34:430-441.