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Nacogdoches, Texas

PLANTS FOLLOWING TIMBER HARVEST: IMPORTANCE TO SONGBIRDS

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Of 35 plant species or groups important as food for songbirds, 28 were more abundant on a clear-cut area than in adjacent pine forest 15 months after a timber harvest. This is an important early finding of a continuing wildlife food study on East Texas upland forests being regenerated by site preparation and planting after clearcutting.

METHODS

The study site was about 24 km (15 miles) south of Nacogdoches, Texas, in a forest dominated by loblolly (Pinus taeda L.) and shortleaf pine (P. echinata Mill.) interspersed with sweetgum (Liquidambar styraciflua L.), blackgum (Nyssa sylvatica Marsh.), and several species of oaks (Quercus spp.).

In May 1970, all trees except a few scattered oaks and gums were cleared from a strip 443 m (1453.4 feet) long and 137 m (449.5 feet) wide; approximately 6.0 hectares (15 acres). Logging slash, understory shrubs and vines, and herbaceous vegetation were cut with a Marden brush chopper and burned in the winter of 1970 - 71. The area was planted to loblolly pine seedlings in late February and early March 1971. The understory of the adjacent uncut forest was burned in February of the same year.

In March, vegetation sampling plots were established on 21 randomly chosen transects across the clearcut strip paralleling its short axis and extending into the adjacent forest. Six sampling points were located along each transect, three in the woods and three in the open, at 10, 30, and 50m from the forest edge (32, 98, and 164 feet respectively).

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[1]Stransky and Halls are on the staff of the Wildlife Habitat and Silviculture Laboratory, which is maintained at Nacogdoches, Texas 75961, by the Southern Forest Experiment Station, USDA Forest Service, in cooperation with the School of Forestry, Stephen F. Austin State University. Nixon is with the Department of Biology, Stephen F. Austin State University, Nacogdoches, Texas 75961.

At each sampling point, herbaceous vegetation was tallied on 1 m^2 (10.7 ft^2) plots in March, April, May, June, August, September and October of 1971. Woody plants were counted in August on 4 m^2 (43 ft^2) plots, centered at the same points.

Density per plot and frequency of distribution were calculated for each species:

$$\text{Density per plot} = \frac{\text{Number of individuals of the species}}{\text{Number of plots}}$$

$$\text{Frequency of Distribution (\%)} = \frac{\text{Number of plots on which species occurs}}{\text{Total plots sampled}} \times 100$$

Use of plant species by songbirds was evaluated as reported by Martin, Zim, and Nelson (1951).

RESULTS AND DISCUSSION

By the end of the first growing season, natural reseeding and sprouting had completely revegetated the clearcut area. Herbaceous species were most abundant in the open; 68% were recorded only on plots in the cutover area. The majority of the woody species (76.8%) occured both in the open and in the woods.

A total of 105 herbaceous species was recorded, including 25 grasses (Gramineae), 24 composites (Compositae), and 13 legumes (Leguminosae) (Table 1). Among the 56 woody species there were 6 oaks, 5 greenbriars (Smilax spp.), 5 members of the rose family (Rosaceae), 4 of the grape family (Vitaceae), and 3 sumacs (Rhus spp.) (Stransky et al., 1974) (Table 2). In both tables, species and species groups reported by Martin, Zim and Nelson (1951) to provide food for one or more songbird species are followed by asterisks. Many of the other species are probably consumed, but were not identified in available reports. Thus most of the grasses, sunflowers and smaller-seeded legumes probably constitute important food resources for many of these bird species.

The most frequently occuring songbird food plants included wood-sorrel (Oxalis dillenii Jacq.), three-seeded mercury (Acalypha spp.), shining sumac (Rhus copallina L.), blackberry (Rubus spp.), Virginia creeper (Parthenocissus quinquefolia (L.) Planch.), panic grasses (Panicum spp.), ragweed (Ambrosia artemisiifolia L.), poison ivy (Rhus toxicodendron L.), greenbriars (Smilax spp.), and sassafras (Sassafras albidum (Nutt.) Nees.). All except the last three were more plentiful in the open than in the woods. In Table 3, eight of these species are rated according to their importance for songbirds that were frequently sighted on this area before timber cutting (Michael and Thornburgh, 1971). The seasonal occurrence of the birds is coded according to Fisher[2].

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[2]Fisher, C. D. 1974. Preliminary Checklist of the Birds of the Pineywoods Region of East Texas. Stephen F. Austin State University, Department of Biology. 3 pp. Mimeo.

In addition to the birds listed in Table 3, we observed the Ruby-Throated Hummingbird (Archilochus colubris). It feeds on flowers of Japanese honeysuckle (Lonicera japonica Thunb.), thistle (Cirsium spp.), beebalm (Monarda punctata L.), verbain (Verbena halei Small), and evening primroses (Oenothera spp.), all of which grew on the open area.

Other plant species producing food for small seed-eating birds found on the cleared area included sedges (Cyperaceae), rushes (Juncaceae), spurges (Euphorbiaceae), wild geranium (Geranium carolinianum L.), plantain (Plantago virginica L.), peppervine (Ampelopsis arborea (L.) Koehne), American beautyberry (Callicarpa americana L.), American holly (Ilex opaca Ait.), red mulberry (Morus rubra L.), and common persimmon (Diospyros virginiana L.), nightshades (Solanaceae), violet (Viola septemloba Le Conte), grapes (Vitis spp.), rusty blackhaw (Viburnum rufidulum Raf.), and flowering dogwood (Cornus florida L.).

The seasonal peaks in fruiting and seed maturity were distributed over the year so that some kind of food was always available. Seed from late summer- and fall-maturing grapes, greenbriars, sassafras, honeysuckle, Virginia creeper, American beautyberry, peppervine, sumac, poison ivy, ragweed, dovewood (Croton capitatus Michx.), and legumes furnished overwintering food. Fruiting plantain, woodsorrel, panic grasses, sedges, haw, and blackberry provided food in spring and early summer. Grapes, plums, grasses, and a variety of seed-bearing herbaceaous plants were available in late summer and early fall to complete the annual cycle of food production.

This early successional stage immediately after cutting is favorable to seed-eating songbirds, but normally lasts only 4 to 8 years, depending on pine seedling spacing and site quality. Additional nearby cuttings are desirable to afford continuing food supplies before the developing pines shade out the light-demanding herbaceous species.

Plant succession on this study area will be observed for 10 years to quantify the effect of planted pines on wildlife food plant availability.

Table 1 (Continued)

Plant family and species	Open		Woods	
	Density	Frequency	Density	Frequency
GRAMINEAE				
Broomsedge (Andropogon virginicus L.)	.41	20.6	.00	.00
Longleaf uniola (Uniola sessiliflora Poir.)	4.83	61.9	7.33	65.1
Crabgrass (Digitaria violascens Link.)	.89	7.9	.00	.0
Pimple panic* (Panicum brachyanthum Steud.)	2.32	28.6	.00	.0
Lindheimer panic* (Panicum lindheimeri Nash.)	1.00	31.7	.00	.0
Other Panic grasses* (Panicum spp.)	1.60	57.0	.02	1.6
Other grasses	2.17	65.1	.38	15.9
IRIDACEAE				
Blue-eyed grass (Sisyrinchium sagittiferum Bickn.)	.00	.0	.17	4.8
JUNCACEAE				
Rush* (Juncus biflorus Ell.)	.02	1.6	.00	.0
LABIATAE				
Horsemint, Beebalm* (Monarda punctata L.)	.05	1.6	.00	.0
Lyre-leaf sage (Salvia lyrata L.)	.02	1.6	.00	.0
LEGUMINOSAE				
Partridge pea (Cassia fasciculata Michx.)	1.02	27.0	.02	1.6
Tick-trefoil (Desmodium spp.)	.41	23.8	.19	11.1
Milkpea (Galactia volubilis (L.) Britt.)	.44	11.1	.21	6.3
Bush clover (Lespedeza spp.)	.18	6.4	.03	4.8
Other legumes	.42	8.6	.19	4.8
LILIACEAE				
Canada garlic (Allium canadense L.)	.29	3.2	.00	.0
Crow-poison (Nothoscordum bivalve (L.) Britt.)	23.08	60.3	21.50	58.7
LINACEAE				
Flax (Linum medium (Planch.) Britt. var. texanum (Planch.) Fern.)	.70	20.6	.00	.0

Table 1 (Continued)

Plant family and species	Open		Woods	
	Density	Frequency	Density	Frequency
LOGANIACEAE				
Polypremum (Polypremum procumbens L.)	.56	1.6	.00	.0
ONAGRACEAE				
Evening primrose* (Oenothera spp.)	.54	20.6	.02	1.6
OXALIDACEAE				
Wood-sorrel* (Oxalis dillenii Jacq.)	7.30	74.6	.11	6.3
PLANTAGINACEAE				
Plantain* (Plantago virginica L.)	3.70	33.3	.00	.0
POLYGONACEAE				
Heart-sorrel (Rumex hastatulus Ell.)	.06	1.6	.00	.0
POLYPODIACEAE				
Bracken (Pteridium aquilinum (L.) Kuhn)	.02	1.6	.00	.0
RUBIACEAE				
Buttonweed, Poor Joe (Diodia teres Walt.)	.00	.0	.21	4.8
Bluets (Hedyotis spp.)	5.97	33.3	.00	.0
SAXIFRAGACEAE				
Lepuropetalon (Lepuropetalon spathulatum (Muhl.) Ell.)	.37	11.1	.00	.0
SCROPHULARIACEAE				
Toad-flax (Linaria canadensis (L.) Dum.)	.11	6.3	.00	.0
Common mullein (Verbaskum thapsus L.)	.08	1.6	.02	1.6
SOLANACEAE				
Ground cherry (Physalis heterophylla Nees.)	.43	12.7	.06	6.3
Nightshade* (Solanum spp.)	.20	9.5	.05	1.6
UMBELLIFERAE				
Carrot (Daucus pusillus Michx.)	.11	1.6	.00	.0
Black snakeroot (Sanicula canadensis L.)	.92	19.0	.02	1.6

Table 1 (Continued)

Plant family and species	Open		Woods	
	Density	Frequency	Density	Frequency
VALERIANACEAE				
Corn-salad (Valerianella stenocarpa (Engelm.) Krok var. stenocarpa)	.21	4.8	.00	.0
VERBENACEAE				
Texas vervain* (Verbena halei Small)	.02	1.6	.00	.0
VIOLACEAE				
Violet* (Viola septemloba Le Conte)	.27	7.9	.10	6.3

Table 2. Density and frequency of woody plants growing in the open and in the woods. Plants reported to afford food for songbirds are indentified by asterisks.

Plant family and species	Open		Woods	
	Density	Frequency	Density	Frequency
ACERACEAE				
Red maple (Acer rubrum L.)	.03	3.2	.08	4.8
ANACARDIACEAE				
Shinning sumac (Rhus copallina L.)	6.00	47.6	.65	25.4
Scarlet sumac (Rhus glabra L.)	.32	4.8	.08	6.3
Poison ivy* (Rhus toxicodendrom L.)	11.24	55.6	10.92	61.9
APOCYNACEAE				
Climbing dogbane (Trachelospermum difforme (Walt.) Gray)	.06	1.6	.11	3.2
AQUIFOLIACEAE				
American holly* (Ilex opaca Ait.)	.02	1.6	.00	.0
Yaupon (Ilex vomitoria Ait.)	.11	11.1	.14	9.5
BIGNONIACEAE				
Cross-vine (Bignonia capreolata L.)	.49	12.7	.59	14.3
Trumpet creeper (Campsis radicans (L.) Seem)	.00	.0	1.17	1.6
CAPRIFOLIACEAE				
Japanese honeysuckle* (Lonicera japonica Thunb.)	.59	4.8	2.62	6.3
Rusty blackhaw* (Viburnum rufidulum Raf.)	.25	11.1	.29	15.9
COMPOSITAE				
Consumption weed (Baccharis halimifolia L.)	.02	1.6	.00	.0
CORNACEAE				
Flowering dogwood* (Cornus florida L.)	.14	11.1	.14	11.1
Blackgum (Nyssa sylvatica Marsh.)	.10	7.9	.08	7.9
EBENACEAE				
Common persimmon* (Diospyros virginiana L.)	.25	17.5	.14	12.7
FAGACEAE				
Oaks (Quercus spp.)	2.02	98.4	2.32	100.0

Table 2 (Continued)

Plant family and species	Open		Woods	
	Density	Frequency	Density	Frequency
HAMAMELIDACEAE				
Sweetgum (Liquidambar styraciflua L.)	1.14	33.3	.63	28.6
HYPERICACEAE				
St. Andrew's Cross (Ascyrum hypericoides L.)	.21	15.9	.03	3.2
JUGLANDACEAE				
Hickory (Carya spp.)	.07	6.4	.13	12.7
LAURACEAE				
Sassafras* (Sassafras albidum (Nutt.) Nees.)	2.70	36.5	2.21	44.4
LEGUMINOSAE				
Black locust (Robinia pseudoacacia L.)	.17	9.5	1.03	20.6
LILIACEAE				
Saw greenbriar* (Smilax bona-nox L.)	2.75	46.0	1.97	57.1
Other greenbriars* (Smilax spp.)	3.92	60.3	2.97	60.2
LOGANIACEAE				
Yellow-jessamine (Gelsemium sempervirens (L.) Jaume St.-Hil.)	.54	11.1	2.03	31.7
MORACEAE				
Osage orange (Maclura pomifera (Raf.) Schneid.)	.00	.0	.03	3.2
Mulberry* (Morus rubra L.)	.10	6.3	.02	1.6
OLEACEAE				
Old-man's beard (Chionanthus virginica L.)	.22	7.9	.02	1.6
Forestiera (Forestiera ligustrina (Michx.) Poir.)	.16	3.2	.11	6.3
White ash (Fraxinus americana L.)	.00	.0	.02	1.6
PASSIFLORACEAE				
Passion-flower (Passiflora spp.)	.05	14.3	.00	.0
PINACEAE				
Shortleaf pine (Pinus echinata Mill.)	.10	4.8	.25	23.8

Table 2 (Continued)

Plant family and species	Open		Woods	
	Density	Frequency	Density	Frequency
Loblolly pine (Pinus taeda L.)	.73	31.7	.13	7.9
RHAMNACEAE				
Rattan-vine (Berchemia scandens (Hill) K. Koch)	.84	30.2	1.13	27.0
ROSACEAE				
Parsley Hawthorn (Crataegus marshallii Eggl.)	.02	1.6	.00	.0
Plum (Prunus spp.)	.60	15.9	.16	12.7
Blackberry* (Rubus spp.)	7.38	61.9	.94	17.5
RUBIACEAE				
Common buttonbush (Cephalanthus occidentalis L.)	.02	1.6	.00	.0
ULMACEAE				
Texas Sugarberry (Celtis laevigata Willd.)	.08	4.8	.24	14.3
Winged elm (Ulmus alata Michx.)	.38	19.0	.13	9.5
VERBENACEAE				
American beautyberry* (Callicarpa americana L.)	.35	23.8	.17	12.7
VITACEAE				
Pepper-vine*(Ampelopsis arborea (L.) Koehne)	2.89	34.9	1.38	23.8
Virginia creeper* (Parthenocissus quinquefolia (L.) Planch.)	2.68	41.3	1.70	36.5
Grape* (Vitis spp.)	.22	12.7	.29	7.9

Table 3. Use ratings of some common plant species as food for birds sighted near the study area.[1]

Bird Species, and Season of occurrence[2]	Poison ivy	Sumacs	Virginia creeper	Green-brier	Sassafras	Black-berry	Panic grass	Rag-weed
Yellow-shafted Flicker (Colaptes auratus) P (cW, rS)	***	+	*	+		+		
Red-bellied Woodpecker (Centurus carolinus) cP	*		*					
Yellow-bellied sapsucker (Sphyrapicus varius) cW			*		+			
Downy Woodpecker (Dendrocopus pubescens) cP	**		+					
Great-crested Flycatcher (Myiarchus crinitus) uS			*		*	+		
Carolina Chickadee (Parus carolinensis) cP	*							+
Tufted Titmouse (Parus bicolor) cP			*			*		+
Carolina Wren (Thryothorus ludovicianus) cP	+							
Catbird (Dumetella carolinensis) P (vW, cM, uS)	**	*	+	**	*	***		
Brown Thrasher (Toxostoma rufum) P (uW, cM, uS)	+	*	*	+	+	**		
Robin (Turdus migratorius) P (aW, uS)		+	+	*		**		
Hermit Thrush (Hylocichla guttata) cW		*	+	*	+			
Starling (Sturnus vulgaris) cP	*	**	+					
White-eyed Vireo (Vireo griseus) P (rW, cS)	+		+	-	+	+		
Red-eyed Vireo (Vireo olivaceus) cS		+	*		+	+		
Myrtle Warbler (Dendroica coronata) cW	+							
Pine Warbler (Dendroica pinus) cP		+					+	+
Summer Tanager (Piranga rubra) cS						***		
Cardinal (Richmondena cardinalis) cP		*		+		**	*	+
Blue Grosbeak (Guiraca cerulea) cS							**	
Indigo Bunting (Passerina cyanea) cS						**		**
Rufous-sided Towhee (Pipilo erythrophthalmus) uW						**	**	**
Slate-colored Junco (Junco hyemalis) cW	+	+					+	***
White-throated Sparrow (Zonotrichia albicollis) cW	*			+		+	*	****

Table 3 (Continued)

[1] Ratings range from occasional use (+) to verry frequent use (****).

[2] M = Migrant only
P = Permanent resident
S = Summer resident
W = Winter resident

a = Abundant
c = Common
u = Uncommon
r = Rare
v = Very rare