WILDLIFE SESSIONS

FRUITING OF BROWSE PLANTS AFFECTED BY PINE SITE PREPARATION IN EAST TEXAS

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Abstract: Pine planting sites prepared by burning yielded 120 kg/ha of browse fruits the third growing season after site treatment. Control plots yielded 74, KG-bladed plots 57, and chopped plots 41 kg/ha. Blackberries, American beautyberry, sumac, Sebastian bush, muscadine grape, blueberries, and southern wax-myrtle were the principal species. Most fruit was available in summer and fall, but some persisted through winter and spring. Fruit production was related to the number and average height of the fruiting browse species.

Proc. Annual Conf. S.E. Assoc. Fish & Wildlife Agencies 31:5-7

Fruits of native shrubs and vines are important in the diet of wildlife (Martin et al. 1951, Lay 1965). In forest clearings browse plants produce fruit earlier and in greater quantities than under a tree canopy (Lay 1966, Halls and Alcaniz 1968, and Halls 1973). Relatively little is known, though, about the effect of pine planting site preparation on the fruit production of browse plants. Because thousands of hectares are planted annually to pines throughout the South, it is important to know how site treatments affect the kinds and quantities of fruits available to wildlife.

MATERIALS AND METHODS

Study plots were established in 1972 on a nearly level to gently sloping upland forest tract in Jasper County, Texas (Stransky 1976). Before clearcutting in the fall of 1972, the area supported a pine-hardwood forest about 45 years old. The site had never been cleared for cultivation, but it was probably grazed by livestock in years past.

The principal tree species were loblolly pine (*Pinus taeda* L.), shortleaf pine (*P. echinata* Mill.), southern red oak (*Quercus falcata* Michx.), post oak (*Q. stellata* Wangenh.), water oak (*Q. nigra* L.), sweetgum (*Liquidambar styraciflua* L.) and blackgum (*Nyssa sylvatica* Marsh.).

Prominent shrubs were American beautyberry (*Callicarpa americana* L.), yaupon (*Ilex vomitoria* Ait.), blackberry (*Rubus* spp.), and southern wax-myrtle (*Myrica cerifera* L.). The prevalent vines were yellow jessamine (*Gelsemium sempervirens* (L.) Ait. f.), muscadine grape (*Vitis rotundifolia* Michx.), and greenbriers (*Smilax* spp.)

During February and March 1974 the following site preparation treatments were applied in triplicate to 0.6 ha plots in a randomized block design.

Control—no site preparation, all woody stems greater than 2.5 cm in diameter at breast height (dbh) were cut.

Burn—all stems greater than 2.5 cm dbh were cut and burned with the logging slash. Fanned by a steady wind of about 20 km per hour, the head fire consumed the tops of all herbaceous plants, most shrubs and small trees, nearly all the leaf litter, and all but the large branches of the logging slash.

Chop—logging slash and all stems were cut with a chopper and burned. The chopper resembles a huge lawn roller equipped with cutting blades parallel to the long axis of the cylinder. Pulled by a large crawler tractor, the chopper cut non-merchantable trees and shrubs into small chunks and mixed the debris with the surface soil.

KG—all stems were cut with a KG blade, and the logging slash was raked off the plots and burned. The KG blade resembles a straight razor and is mounted at an angle on the front of a tractor. It sheared off all stems in its path, and in the cutting process greatly churned up the soil surface.

During late May and early August in 1976, the third growing season after site preparation and pine planting, fruits were counted by browse species on 20 quadrats of 1 m^2 each within each plot. To get the average ovendry weight per fruit, 100 g of fresh fruit were collected from each species and dried at 70°C. Fruit dry weight was multiplied by the number of fruit per quadrat and converted to kilograms per hectare (kg/ha). Fruit availability was observed from May 1976 through May 1977.

Differences in fruit yield between site treatments were tested by analysis of variance and by Duncan's multiple range test at the .05 level of probability.

Browse stems were counted and their heights measured in May 1976 on the same sampling points as fruit counts.

RESULTS AND DISCUSSION

The burned plots ranked highest in browse fruit production with 120 kg/ha, significantly higher than the 41 kg/ha of the chopped plots. Control plots with 74 kg/ha, and the KG-bladed plots with 57 kg/ha were not significantly different from the chopped plots. Blackberries and American beautyberry contributed most to total fruit yield (Table 1). Generally, the mechanical site preparations, especially chopping, reduced the yield of American beautyberry and Sebastian bush (*Sebastiana fruticosa* (Bert.) Fern.).

Table 1. Fruit yields in kg/ha by site treatments and species in 1976.

	Site treatments			
Species	*Burn*	*Control*	*KG*	*Chop*
Blackberries *Rubus* spp.	39.6	49.0	40.5	21.3
American beautyberry *Callicarpa americana*	41.8	10.5	7.2	5.4
Shining sumac *Rhus copallina*	2.6	2.5	2.2	6.4
Sebastian bush *Sebastiana fruticosa*	14.6	9.1	6.6	0.0
Muscadine grape *Vitis rotundifolia*	9.9	1.7	0.0	0.3
Blueberries *Vaccinium* spp.	0.8	1.0	0.1	6.6
Southern wax-myrtle *Myrica cerifera*	10.9	0.0	0.0	0.6
ALL SPECIES[a]	120.2	73.8	56.6	40.6

[a]Total weights connected by the same line are not significantly different.

Differences in fruit yields between treatments can be partially attributed to the relative number and height of browse stems. On the burned plots the browse plants resprouted quickly and produced 63,882 fast-growing stems per ha that averaged 89 cm in height by 1976 (Table 2). This combination of browse numbers and height produced

Table 2. Average height (cm) of shrubs by site treatments and species in 1976.

	Site treatments			
Species	*Control*	*Burn*	*Chop*	*KG*
Shining sumac *Rhus copallina*	198	123	129	85
Blackberries *Rubus* spp.	125	113	92	104
Southern wax-myrtle *Myrica cerifera*	99	114	78	82
American beautyberry *Callicarpa americana*	84	67	57	38
Blueberries *Vaccinium spp.*	68	46	45	57
Sebastian bush *Sebastiana fruticosa*	63	74	60	39
AVERAGE HEIGHTS	106	89	77	67

more fruits than the combination of fewer (54,281 stems/ha) but taller (106 cm) plants on the control plots. Species mainly responsible for the difference between these two treatments were American beautyberry, southern wax-myrtle, muscadine grape and Sebastian bush.

The relatively low fruit yields on the KG plots were probably caused by the destruction of many browse plants at treatment time and the slow subsequent height growth of those that survived. Among the heavy fruit producers, blackberries were the only species not markedly reduced by the KG treatment.

On the chopped plots, browse plants sprouted prolifically and produced an abundance of stems (87,433 stems/ha), but with the exception of blackberry, the stems had not grown enough in height by 1976 to be major fruit producers.

Though yaupon and greenbriers were prominent before site treatment, no fruit could be collected because mechanical site treatments and burning apparently retarded the fruiting of these plants.

Field observations confirmed earlier studies which found that most ripe fruit was available from late spring through fall (Vines 1960, Halls and Ripley 1961, and Halls 1973). Shining sumac (*Rhus copallina* L.) and southern wax-myrtle retained some fruit throughout the winter and spring months, and American beautyberry retained a few seeds. Thus, some fruits were available through most of the year.

Using chemical composition and digestibility to rate the usefulness of fruits and seeds to wildlife, Short and Epps (1972) found that southern wax-myrtle, muscadine grape, and blueberries rated high; sumac and American beautyberry rated medium. Martin et al. (1951) stated that blackberries, blueberries, wax-myrtle and grape rate very high as food for birds and mammals in the South. American beautyberry is sought by some of our best known birds, and Lay (1965) found that deer eat the fruits too. Sumac is important in winter because its fruits persist when others are scarce.

The capacity of a forest habitat to produce wildlife is largely governed by the availability of fruits. This study shows that browse fruit yields may be substantial after a clearcut. However, among the site treatments tested, the prescribed burn and the untreated control were more productive of fruits than the mechanical treatments, perhaps because the mechanical treatments significantly reduced soil organic matter and associated nutrients during the early years of the rotation (Stransky 1976). The study is being continued to further document the relationships between fruits and site treatments as the pine timber develops.

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