

<1>

Accession Number

BACD200000103208

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Title

Effect of soil compaction and organic matter removal on two earthworm populations and some soil properties in a hardwood forest.

Source

Pedobiologia. 43(6). Dec., 1999. 802-807.

Abstract

Earthworms can alter the physical, chemical, and biological properties of a forest ecosystem. Any physical manipulation to the soil ecosystem may, in turn, affect the activities and ecology of earthworms. The effects of organic matter removal (logs and forest floor) and soil compaction on earthworm activities were measured in a central hardwood region (oak-hickory) forest in the Missouri Ozarks. Soils in this region are characterized by a cherty residuum that is primarily of the Clarksville series (Loamy-skeletal, mixed, mesic Typic Pale-dults). Earthworms were collected from a 15 cm depth each spring and fall for 2 years by the handsorting method and estimated on a per meter square basis. Two earthworm species, *Diplocardia ornata* and *Diplocardia smithii*, were the most dominant native species found in the site. Organic matter removal decreased the average individual biomass of both species. However, these species responded differently to soil compaction. Soil compaction affected *D. ornata* adversely and *D. smithii* favorably. This suggests that the degree of soil compaction was not restrictive to *D. smithii* (2-mm dia) but it was to *D. ornata* (5 mm dia). Moreover, the apparent better soil environmental conditions resulting from the remaining organic matter in compacted soil enhanced *D. smithii* population and growth. Sampling position affected *D. ornata* but not *D. smithii*. Other factors influencing the ecology and activity of these two species will require further study.

<2>

Accession Number

BACD200000026555

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Title

Random amplified polymorphic DNA variation among remnant big bluestem (*Andropogon gerardii* Vitman) populations from Arkansas'' Grand Prairie.

Source

Molecular Ecology. 8(10). Oct., 1999. 1693-1701.

Abstract

Random amplified polymorphic DNA (RAPD) analysis was used to characterize genetic diversity and genetic distinctiveness of *Andropogon gerardii* from remnant Arkansas prairies. Six oligonucleotide primers, which generated 37 RAPD bands, were used to analyse 30-32 plants from six Grand Prairie populations, Baker Prairie (Arkansas Ozarks), two Illinois prairies and two cultivars. Genetic diversity of the Arkansas remnants ranged from 82.7 to 99.3%, with 89% of the total genetic variation within and 11% among populations. The

partitioning of genetic variation was consistent with that reported for other outcrossing perennial grasses, using the more conservative allozyme markers. Principal component analysis indicated a northern and southern association within Arkansas' Grand Prairie. Although there was no genetic structuring at the landscape level, the Illinois prairies and cultivars were different from all Arkansas prairies tested. There was significant within-population structuring in four of the seven Arkansas remnants, with a negative relationship between genetic similarity and geographical distance. The three nonstructured populations were from a linear railroad remnant, suggesting different population-level dynamics from nonlinear prairies. The results of this study indicated that small isolated remnant big bluestem populations were not genetically depauperate and that genetic relationships among populations could not be predicted solely on geographical proximity.

<3>

Accession Number

BACD199900326674

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Title

Host associations of braconid parasitoids (Hymenoptera: Braconidae) reared from Lepidoptera feeding on oaks (*Quercus* spp.) in the Missouri Ozarks.

Source

Entomological News. 110(4). Sept.-Oct., 1999. 225-230.

Abstract

Host/parasitoid records are provided for 32 species of braconid wasps attacking a large complex of caterpillars that feed upon five species of oaks (*Quercus* spp.) in the Missouri Ozarks. Forty of the 62 host records are new for the given species of braconids.

<4>

Accession Number

BACD199900314083

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Title

Population density as a predictor of genetic variation for woody plant species.

Source

Conservation Biology. 13(5). Oct., 1999. 1079-1087.

Abstract

As the focus of conservation biology shifts toward multispecies and ecosystem conservation and management, a principal question becomes how we manage species to conserve their long-term evolutionary potential. Few criteria exist for prioritizing which populations within a species should be protected to conserve maximal genetic variation. We designed this study to explore the genetic consequences of using population density as a criterion for selecting populations of woody plant species for conservation. Population density may be an effective gauge of genetic variation for two reasons. First, density often

reflects ecological population size, particularly for continuously distributed species, and density is much easier to measure in the field than population size. Second, from an individual species' perspective, population density may be an indicator of habitat quality. We evaluated the relationship between standard genetic diversity indices and densities of seedlings, small trees, and large trees, and we investigated the association between genotypic composition and density measures with canonical correlation analysis for three common tree species (*Carya tomentosa*, *Sassafras albidum*, and *Quercus alba*) from the Missouri Ozarks. We found that population density was not correlated with genetic diversity in large populations of plant species, but density was associated with genotypic composition of populations. That is, populations with small densities had different genotypes than those with large densities. To sample a maximal amount of regional genotypic variation, we recommend choosing plant populations representing a range of densities. Findings from our study should be generally applicable to plant populations that have occupied habitats long enough for natural selection to affect local genotypic composition. Used in conjunction with other established criteria, population density may be a useful rule of thumb for conservation practitioners concerned with the maintenance of adaptive genetic variation in plant species.

<5>

Accession Number

BACD199900243158

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Title

Reconstruction of early nineteenth-century vegetation and fire regimes in the Missouri Ozarks.

Source

Journal of Biogeography. 26(2). March, 1999. 397-412.

Abstract

Aim The purpose of this study was to reconstruct early nineteenth-century vegetation and fire regimes to examine the role of fire, topography, and substrate interactions in shaping landscape and regional vegetation patterns. **Location** Our study area was the Current River watershed of the Ozark Highlands in south-central Missouri, USA. **Methods** We combined analysis of early nineteenth-century Public Land Survey (PLS) notes and dendrochronology-based fire histories to reconstruct vegetation and disturbance regimes of pine-oak (*Pinus-Quercus*) woodlands. Three methods were used to display and analyse PLS data within a Geographic Information System (GIS): (1) simple point distributions for each tree species; (2) section line descriptions of each tree species and other coded features (e.g. 'prairie'); and (3) spatial interpolation of the point-tree data. Vegetation patterns were then related to geological parent material, topography, and mean fire-return intervals from 23 sites using correlation and Canonical Correspondence Analysis (CCA). **Results** The most striking patterns in the early 1800 s were extensive stands of shortleaf pine (*Pinus echinata* Mill.) and oak-dominated 'barrens' (savanna) in the frequently burned areas south-west of the Current River, and more mesophytic, fire-sensitive species (red oaks (*Quercus rubra* L., *Q. coccinea* Muenchh.), maples (*Acer rubrum* L., *Acer saccharum* Marsh), eastern red cedar (*Juniperus virginiana* L.) in a fire shadow north-east of the river. Several kilometre-wide ecotones of pine-mixed hardwood encompassed the major pineries and barrens. Fire-return

intervals and relative dominance of several tree species were strongly correlated at both fine (3-64 km²) and coarse (> 100 km²) spatial scales. At fine scales, relative dominance of shortleaf pine increased with increasing fire frequency during 1701-1820. Relative dominance of black oak (*Q. velutina* Lam.), and to a lesser extent post oak (*Q. stellata* Wang.), decreased with increasing fire frequency. Shortleaf pine and these xerophytic oak species occurred on similar bedrock types but were strongly differentiated by fire regimes. Main conclusions Fires exerted strong constraints on vegetation composition and patterns. Historical patterns of Native American occupancy in the region are consistent with the reconstructed vegetation and fire histories and suggest that anthropogenic fire regimes played an overriding role in the development of Ozark vegetation in the 1800s.

<6>

Accession Number

BIOA199800378997

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Title

Vegetation of limestone and dolomite glades in the Ozarks and Midwest regions of the United States: A review.

Source

American Journal of Botany. 85(6). June, 1998. 29.

<7>

Accession Number

BIOA199800179403

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Title

Improving estimates of acceptable growing stock in young upland oak forests in the Missouri Ozarks.

Source

Northern Journal of Applied Forestry. 15(1). March, 1998. 28-32.

Abstract

Estimates of regeneration or growing stock in young oak forests may be too high unless criteria are established that define explicitly acceptable growing stock. In young hardwood stands, crown class can be used to identify acceptable growing stock because it is related to the future growth and survival of reproduction. A method is presented for assigning crown class categories to hardwood stems based on their diameters (dbh). Young upland oak forests originating from clearcuts in the Missouri Ozarks were sampled to determine the relationship between dbh and crown class. Stands were 19 to 25 yr old. Threshold diameters (TD) separating one crown class category from another were determined using regression analyses. TD was not significantly affected by species group, and in some cases by aspect and slope position. Quadratic mean stand diameter (QMSD) was significantly related to TD. As QMSD increased so did TD. When QMSD equals 3 in., trees with dbh \geq 3.9 in. are allocated to the codominant and dominant crown class category, and those \geq 2.5 in. to the dominant, codominant, and intermediate category. TD can be used to assign a crown class

category to individual trees, thereby improving estimations of acceptable growing stock. By this method, crown class can be used to define acceptable growing stock and evaluate stocking, yet it does not have to be measured in stand inventories.

<8>

Accession Number

BIOA199799812215

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Title

The importance of gap processes in the development and maintenance of oak savannas and dry forests.

Source

Journal of Ecology. 85(5). 1997. 635-645.

Abstract

1. We examined the dynamics of a *Quercus*-dominated dry forest-savanna complex in the Ozark Highlands of the central United States, focusing on regeneration patterns within gaps. The study area includes one of very few temperate *Quercus* ecosystems not degraded by fire suppression, logging or excessive grazing. 2. We compared patterns of tree seedling establishment, tree height growth and postfire survival in gaps between savanna, found only on south and west aspects in our study area, and dry forest, found only on north and east aspects, to determine which factors contributed to maintaining structural differences. 3. Canopy gaps constituted 42% of savanna area compared with 17% for dry forest. Mean canopy gap size in savanna was 316 m² compared with 185 for dry forest, but gap sizes were highly variable and the difference was not significant. Remnants of canopy trees were found in 37 of 38 gaps, indicating that gaps in both savanna and dry forest can usually support trees. 4. Savanna and dry forest gaps were generally favourable for seedlings and growth of small trees. Seedlings of most woody species were widespread in the understoreys of both savanna and dry forest but were more abundant in gaps than under closed canopies. Species had different height growth patterns depending on site, with growth rates ordered as follows: *Quercus velutina* in savanna > *Q. velutina* in forest > *Q. stellata* in forest > *Q. stellata* in savanna. Site differences were significant for *Q. stellata* but not for *Q. elutina*. 5. Tree survival in two surface fires was significantly lower in gaps in savanna compared with gaps in dry forest. Survival within individual gaps was inversely related to grass cover. In savanna, survival of small trees (2.5-7 cm d.b.h.) ranged from > 80% for gaps with < 5% grass cover to < 50% survival in gaps with > 90% grass cover. 6. Canopy gaps in the Ozarks are created primarily by windfall and drought-related dieback, but fire influences the timing and rate of gap infilling. Understanding the interactions among these disturbances may help clarify the dynamics of many temperate woodlands once dominated by surface fires.

<9>

Accession Number

BIOA199799737196

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Title

Oak regeneration and overstory density in the Missouri Ozarks.

Source

Canadian Journal of Forest Research. 27(6). 1997. 869-875.

Abstract

Reducing overstory density is a commonly recommended method of increasing the regeneration potential of oak (*Quercus*) forests. However, recommendations seldom specify the probable increase in density or the size of reproduction associated with a given residual overstory density. This paper presents logistic regression models that describe this relation for a forest in the Ozark Highlands of Missouri that has been managed for 40 years by the single-tree selection system. In general, density of oak reproduction of a given size increases with decreasing residual stand basal area. However, the corresponding increase in the reproduction density at all levels of overstory density indicates low predictability of individual stands. The models nevertheless describe the average trend in the highly stochastic regeneration process. They also suggest that stand densities must be kept low (e.g., basal areas $< 14 \text{ m}^2 \text{ cntdot ha}^{-1}$) to sustain the requisite recruitment of reproduction into the overstory under the single-tree selection method.

<10>

Accession Number

BIOA199799702583

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Title

A biosystematic study of the Interiores species group of the genus *Vernonia* (Compositae).

Source

Brittonia. 24(4). 1972. 363-378.

Abstract

The taxa of the Interiores species group are treated as two species, one of which is divided into two subspecies. *Vernonia missurica*, a widespread taxon, has large flower heads (32-58 flowers per head), obtuse involucre bract tips, and a characteristic flavonoid chromatographic profile. *Vernonia baldwinii* ssp. *baldwinii*, occurring throughout the Ozarks and Ouachitas, and *V. baldwinii* ssp. *interior* to the Central Plains possess smaller flower heads (17-34 flowers per head), acute or acuminate involucre bracts, and a different chromatographic profile. *Vernonia baldwinii* ssp. *baldwinii* is distinguished from ssp. *interior* by the recurved involucre bract tips and by the possession of more flowers per head. Morphological data reveal that an intergradation zone exists between the population systems of the two subspecies along the edges of the Ozarks and Ouachitas. Although much gene exchange occurs between these two taxa, they maintain a level of genetic integrity that permits their ready recognition throughout wide ranges. All three taxa have a gametic chromosome number of $n=17$ and hybridize extensively with sympatric species.

<11>

Accession Number

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Title

Presettlement vegetation patterns along the 5th Principal Meridian, Missouri
Territory, 1815.

Source

American Midland Naturalist. 137(1). 1997. 79-94.

Abstract

Data from the original General Land Office (GLO) survey (1815) of the 5th
Principal Meridian were used to evaluate presettlement vegetation patterns in
eastern Missouri and Arkansas. Data were divided into three physiographic
sections: Mississippi Alluvial Plain, Ozark Plateau and Dissected Till Plain.
Distances to bearing trees and diameters were used to estimate tree density and
to evaluate the relative structure and composition of presettlement vegetation.
The Mississippi Alluvial Plain was the most densely timbered physiographic
section. White oak (*Quercus alba*), black oak (*Q. velutina*), sweet gum
(*Liquidambar styraciflua*) and hickory (*Carya* spp.) had high importance values.
Significantly lower tree densities occurred in the Ozark Plateau and Dissected
Till Plain. Important components of the Ozark Plateau were shortleaf pine (*Pinus*
echinata), white oak, black oak and post oak (*Q. stellata*). In the Dissected
Till Plain, white oak was dominant and black oak, hickory, elm (*Ulmus* spp.) and
sycamore (*Platanus occidentalis*) were important components. There has been some
debate regarding the presettlement structure of timbered lands in the Ozark
Plateau. Some biologists argue that closed forest once dominated the Ozarks,
whereas others argue the region was once dominated by open woodland. The
evidence presented here suggests the Ozark vegetation was, in general, an open
woodland landscape in 1815.

<12>

Accession Number

BIOA199699102012

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Title

Effects of long-term annual and periodic burning on tree survival and growth
in a Missouri Ozark oak-hickory forest.

Source

Forest Ecology & Management. 82(1-3). 1996. 1-9.

Abstract

In a Missouri Ozark Mountains oak-hickory forest, long-term annual and
periodic burning regimes decreased survival of *Carya* and *Erythrobalanus* oak
species, but had little impact on survival of *Quercus stellata*. Reductions in
survival of *Carya* and *Erythrobalanus* species were greater in periodically- than
in annually burned plots. Compared with *Q. stellata* mortality, *Carya* mortality
was less closely related to pretreatment diameter, possibly because of drought-
related mortality between 1972 and 1984. *Erythrobalanus* mortality was likely
related to drought both during the first measurement interval, between 1949/1951
and 1964, and during the last period, between 1972 and 1984. Survival increased
with pretreatment diameter for *Q. stellata* and peaked at an intermediate
diameter for the *Erythrobalanus* species. The relationship between diameter and
survival was likely associated with self-thinning and natural life-span limits
of trees and was modified by fire regimes. Fire accelerated the loss of small-
diameter trees in all species. The results suggest that use of fire as a tool to
influence species composition oak-hickory forests must include considerations of

stand age, species life-span, stages of stand development and environmental stresses.

<13>

Accession Number

BIOA199699038107

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Title

Shortleaf pineseed production in natural stands in the Ouachita and Ozark Mountains.

Source

Southern Journal of Applied Forestry. 20(2). 1996. 74-80.

Abstract

Seed production of shortleaf pine (*Pinus echinata* Mill.) was monitored from 1965 to 1974 to determine the periodicity of seed crops in both woods-run stands and seed-production areas. One bumper and two good seed crops occurred during the 9-yr period. The two largest crops occurred in successive years, then seed production was low for 4 yr before another good crop occurred. Mean annual seed production ranged from 84,000/ac in the western Ouachitas to 167,000/ac in seed-production areas in the southern Ozarks. Certain stand-level variables significantly influenced seed production. Seed production was positively related to stand age and negatively related to pine and hardwood basal areas; although frequently significant, no consistent relationship occurred with stand elevation. Results indicate that shortleaf pine seed production will usually be adequate for natural regeneration within most of the study area.

<14>

Accession Number

BIOA199598474351

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Title

The influence of drought on red oak group species growth and mortality in the Missouri Ozarks.

Source

Canadian Journal of Forest Research. 25(7). 1995. 1119-1127.

Abstract

The effects of drought on growth of red oak group species were studied by examining basal area increment and ring width index patterns of dominant *Quercus coccinea* Muenchh. (scarlet oak) and *Quercus velutina* Lam. (black oak) trees sampled in 1990-1991 on 62 continuous forest inventory plots located across the southeastern Missouri Ozark Mountains. Trees of both species were older on plots that had suffered high mortality and showed post-1979 reductions in growth rate compared with trees growing on low-mortality plots. *Quercus coccinea* trees from high-mortality plots that were dead at the time of sampling exhibited a distinct flattening in growth rate after the mid-1930s, although death did not occur for many years. Severe droughts in 1980 and 1986-1988 were associated with further accentuated reductions in growth rate in dead trees. Dead *Q. coccinea* that had grown on plots with lower mortality showed comparable reductions in basal area

index and similar post-1979 growth patterns, but the departure in basal area index between living and dead trees occurred 2 decades later and was associated with a severe drought during 1953-1956. Additionally, dead trees on lower mortality plots grew faster than living trees for many years before the 1953-1956 drought, suggesting that rapid early growth rates may predispose trees to early death under certain conditions. The ring width index chronologies of both species growing on high- and low-mortality plots were significantly correlated with Palmer drought severity index values, further emphasizing that drought has an important influence on growth of red oak group species in the Missouri Ozarks. Analysis of first differences of ring width index chronologies indicated that severe drought had an additional of severe droughts in predisposing trees to eventual death.

<15>

Accession Number

BIOA199598467200

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Title

A dendrochronological study of black and scarlet oak decline in the Missouri Ozarks.

Source

Forest Ecology & Management. 75(1-3). 1995. 69-75.

Abstract

Examination of tree-ring data revealed important relationships regarding red oak decline in the Missouri Ozarks. Red oaks, mainly black and scarlet oak, exhibiting greater than 30% crown dieback had significantly lower present-day growth rates compared with trees with less than 30% dieback. Red oaks with declining crowns first showed significantly lower radial growth than trees that are healthy at present in the 10 years following years of severe drought in southeastern Missouri. These dates for initiation of radial growth decline varied by tree age, and were 1936 for 60-79-year-old trees and 1952 for 40-59-year-old trees.

<16>

Accession Number

BIOA199598183796

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Title

Nesting habitat and nesting success of eastern wild turkeys in the Arkansas Ozark highlands.

Source

Condor. 97(1). 1995. 221-232.

Abstract

I studied nesting habitat of the eastern Wild Turkey (*Meleagris gallopavo silvestris*) in the Arkansas Ozarks during the breeding seasons of 1992 and 1993. Hens selected cover with greater complexity and variability in habitat structure than was generally available. Vegetation in preferred cover types provided substantial concealment at 0-1 m height. Hens selected large patches of habitat

(about 80 m in diameter) for nesting. Areas adjacent to nests had characteristics intermediate between nest and non-use sites. Open overstory at nest site and dense understory adjacent to the nest-site areas were apparently used as cues in nest habitat selection early in spring. Parameters correlated with enhanced lateral and overhead concealment of the nest site contributed the most to discrimination between used and non-used sites. Successful and depredated nests were best discriminated when data were considered on a larger spatial scale. Visual obstruction of the nest at 0-1 m height and variable nesting habitat appearance contributed the most to avoiding nest predation. Vegetation characteristics at re-nest sites were more variable, resulting in habitat appearance more diverse than that of first nest sites. I suggest that nest predation influences habitat selection here and availability of suitable nesting habitat may be a limiting factor for Wild Turkey populations in the Arkansas Ozarks.

<17>

Accession Number

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Title

Fire frequency on an oak-hickory ridgetop in the Missouri Ozarks.

Source

American Midland Naturalist. 132(2). 1994. 393-398.

Abstract

Wedges taken from 24 post oaks (*Quercus stellata* Wang.) growing on a ridge in an oak-hickory stand were used to reconstruct the fire history in the Houston Ranger District in Missouri's Mark Twain National Forest. A chronology was constructed dating from 1734 to 1991. Fire frequency was greatest between 1740 and 1850 with a mean return interval of 2.8 yr. After 1850, the fire return interval increased to 24 yr. This change in fire return regimes is coincident with settlement of the area by Anglo-Americans.

<18>

Accession Number

BIOA199497511226

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Title

Pre-outbreak management recommendation for 60-year-old declining oak stands in the Ozarks.

Source

Northern Journal of Applied Forestry. 11(3). 1994. 98-101.

Abstract

A pre-outbreak management strategy was developed for 60-yr-old declining natural stands of scarlet and black oak. The series of management alternatives which maximized the net present worth of these stands growing on a moderate-quality site specifies individual-tree selective thinnings at ages 40 and 50, shelterwood cut at age 60, and final harvest at age 63. This strategy yielded the highest NPW of 331.77/ac, 8.3 mbf of sawlogs, and approximately 15 cords of

pulpwood while reducing tree mortality by 20% over unmanaged stands. Recommendations for forest managers include as first priority the removal of oaks with 30% or greater crown dieback, and secondly, the removal of smaller diameter, overtopped scarlet and black oaks.

<19>

Accession Number

094083343

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Title

SOIL PH TOPOGRAPHY AND FOREST VEGETATION IN THE CENTRAL OZARKS.

Source

American Midland Naturalist 128 (1). 1992. 40-52.

Abstract

In a detrended correspondence analysis (DCA) ordination, 81 forested sites in the southern Missouri USA Ozarks fell into three different groups. Groups I and II were upland, and Group III consisted of 17 bottomland stands with high importance of *Platanus occidentalis*. In Group I (34 upland stands), *Quercus alba*, *Q. velutina*, *Q. rubra* and *Carya texana* codominated in various combinations, but *Q. velutina* reached higher importance percentage (I.V.) at higher elevation above the streams and on more acid soils, whereas *Q. alba* was most important at lesser heights above the streams and on less acid soils. *Pinus echinata* and *Q. stellata* were concentrated at opposite ends of a DCA ordination of Group I, with *Q. stellata* I.V. highest on southern and western aspects and ridgetops and with *P. echinata* on various aspects. *Quercus* and *Carya* were reproducing well in all Group I stands and *Acer saccharum* in only a few. In Group II (30 upland stands generally with higher pH than Group I stands), a DCA ordination revealed a vegetational gradient correlated with aspect, with *Juniperus virginiana* stands on southern and western aspects at one end and stands with *Tilia americana* at the other end. *Quercus muehlenbergii* decreased in importance from the *Juniperus* end toward the *Tilia* end, whereas *Acer saccharum* increased over the same gradient. High abundance of *Fraxinus americana* and *Ulmus rubra* occurred where *Acer saccharum* was abundant. *Quercus rubra*, the only species important in both Group I and Group II, was abundant all across the Group II ordination, but was most important toward the *Tilia* end. *Quercus* spp. were not reproducing well in Group II stands, whereas *Acer saccharum* was, even in stands at the *Juniperus* end of the ordination. The differential reproduction of *Quercus* spp. vs. *Acer saccharum* on more acid vs. less acid to basic soils suggests that not only present composition but also potential (sapling layer) vegetation is related to soil pH.

<20>

Accession Number

092051978

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Title

TREE-RING ANALYSIS OF FIRE HISTORY OF A POST OAK SAVANNA IN THE MISSOURI USA OZARKS.

Source

Natural Areas Journal 11 (2). 1991. 93-99.

Abstract

Fire scars from 43 trees were dated by dendrochronological methods to reconstruct the extent and frequency of fire in an area of post oak savannas in southern Missouri. Post oak (*Quercus stellata* Wang.), shortleaf pine (*Pinus echinata* Mill.), and eastern red cedar (*Juniperus virginiana* L.) trees from the Caney Mountain Wildlife Refuge were used to construct two fire-scar chronologies. Fire frequency and extent was found to be greater between 1700 and 1810 on post oak savannas. The mean fire-free interval during the pre-1810 period was 4.3 years for an area of post oak savanna of approximately 2.5 km². Evidence for several fires at least 6 km² in extent was found from trees scarred in the years 1785, 1796, and 1806. A decrease in fire frequency on post oak savannas began in 1820, the time when native Americans began moving westward out of this area. In oak-pine woods, fire frequency was found to increase after 1850 with the settlement of the area in the 1860s by European-Americans.

<21>

Accession Number

091030766

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Title

MODERN POLLEN RAIN IN THE SOUTHWEST MISSOURI OZARKS USA.

Source

American Midland Naturalist 124 (2). 1990. 263-268.

Abstract

Bryophytic polsters and surface samples were collected from four sites in Shannon and Carter counties in the SE Missouri Ozarks to determine modern pollen rain. Regional pollen rain and variation in the local pollen rain are reflected by modern pollen spectra. Regional pollen rain was calculated by averaging the percentages of the various taxa in the pollen spectra from the 10 samples collected. In this area the average regional pollen rain is dominated by *Pinus* (18.5), *Quercus* (51.5), *Carya* (4.4) and *Ambrosia* (8.7). The data are consistent with the mosaic of pine-oak and oak-hickory-pine forests characteristic of this region.

<22>

Accession Number

090061828

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Title

NITRIFICATION POTENTIAL OF SECONDARY SUCCESSION UPLAND OAK FORESTS I. MINERALIZATION AND NITRIFICATION DURING LABORATORY INCUBATIONS.

Source

Soil Science Society of America Journal 54 (3). 1990. 892-897.

Abstract

Experiments were carried out to examine factors regulating N mineralization and nitrification in upland oak (*Quercus* spp.) forests of the Missouri Ozarks

USA. Soils were collected from three sites representing secondary oak succession. Sampling dates represented different stages in the phenological development of the vegetation during a 1-yr period. Soils were incubated in the laboratory, and changes in soil NO₃⁻ and NH₄-N were measured, along with changes in populations of autotrophic NH₄-oxidizing bacteria. The NO₃-production curves during laboratory incubation were used to calculate three variables that describe potential nitrification. These variables were lag prior to NO₃ accumulation, and initial rate and maximum rate of NO₃ production. This nitrification potential is greater in more mature oak stands. Multiple regression analyses of these data show that nitrification in these sites is indirectly regulated by soil NH₄-N availability and pH. However, the strong sampling-date effect on soil NH₄-N levels, lags in nitrification, and populations of NH₄-oxidizing bacteria suggest interactions between soil nitrification potential and possible inhibition by vegetation.

<23>

Accession Number

090026669

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Title

ADAPTATION TO SUBSTRATE IN ROCK OUTCROP PLANTS INTERIOR HIGHLANDS TALINUM PORTULACACEAE.

Source

Botanical Gazette 150 (4). 1989. 449-453.

Abstract

Talinum calycinum Engelm. (Portulacaceae) and *T. parviflorum* Nutt. are small succulent-leaved perennial herbs of very shallow soils of rock outcrops in the Interior Highlands (Ozarks and Quachitas), United States. The first species has been considered substrate indifferent, occurring on a variety of outcrops but only rarely on limestone; the second also occurs on a variety of outcrops, but not on limestone. Populations of *T. parviflorum* from sandstone outcrops grown experimentally on native and alien soils grew as well on shale outcrop soils as on their own native sandstone soils, but when grown on calcareous outcrop soil showed abnormal coloration (yellow-green, with much red pigment), high mortality, and extremely poor total growth. In *T. calycinum* also, all populations, regardless of origin (sandstone, shale, granite, syenite, limestone), grew well on all noncalcareous soils, but grown with extremely poor on calcareous soils. *Talinum calycinum* thus is not substrate indifferent but, in fact, its growth is greatly inhibited by calcareous soils. However, while populations of *T. calycinum* from the first four outcrop types showed abnormal coloration and brown spotting on leaves when on the limestone outcrop soil, the limestone outcrop population had normal coloration. The population had normal coloration. The population from limestone is not a limestone outcrop ecotype in the usual sense that it grows well there, but some ecotypic adaptation has occurred in this population. Natural selection has not shifted its adaptive peak away from noncalcareous soil types, but has only extended the extreme limit of its tolerance curve to include calcareous soils. Thus, *T. calycinum* does not accomplish its broad substrate distribution by broad ecological tolerance or classical ecotypic races with divergent adaptive peaks. Instead, a local population has a slightly broadened tolerance that allows it to remain healthy and grow, albeit very slowly, in an environment even more inhospitable to the more common population type.

<24>

Accession Number

089102701

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Title

THE GENETIC CONSEQUENCES OF HABITAT FRAGMENTATION.

Source

Annals of the Missouri Botanical Garden 77 (1). 1990. 13-27.

Abstract

The natural habitats of many species have become fragmented into small "islands," principally by human activities. In this paper we discuss the long-term genetic and evolutionary consequences of fragmentation as inferred from studies on populations that have undergone natural habitat fragmentation in the Ozark Mountains. The Ozarks are the highest land formation found in the midwestern United States. Because of the absence of major geographical barriers around the Ozarks, plants and animals from diverse parts of the continent have been able to invade the area during post-Pleistocene climatic periods. Many of these invasions were short-lived, but the geological and topographical complexity of the Ozarks provided numerous relictual habitats. As a consequence, natural habitat fragmentation occurred from many species, and the fragmentation has often persisted for thousands of years. The genetic and ecological consequences of habitat fragmentation depend critically upon whether or not habitat fragmentation results in a complete cessation of dispersal between the habitat islands. If habitat fragmentation results in the complete genetic isolation of habitat islands, then each "island" becomes demographically independent and local extinction can occur. When there is no opportunity for recolonization, an "extinction ratchet" is possible in which each local extinction brings the global population irreversibly one step closer to total extinction. It is therefore critical to know if habitat fragmentation actually prevents dispersal or not. Unfortunately, studying dispersal patterns directly is usually not feasible. We show how genetic surveys can be used to answer this question. Given demographic fragmentation, we also show how genetic surveys can pinpoint species at high risk for local extinction. These suffer the most severe genetic consequences from habitat fragmentation, such as a drastic loss of genetic variability within habitat islands and inbreeding depression. On the positive side, the genetic variation of a fragmented species is not totally lost but is often present as fixed differences between different local populations. Indeed, a fragmented population is subject to less global loss of genetic variation than an equally sized panmictic population. Consequently, as long as the rate of local extinction is relatively small or counteracted by a recolonization program, a fragmented species can preserve almost all of its genetic variation at the global level for long periods of time. We discuss the optimal design for the recolonization program to prevent global extinction and to maintain high levels of global genetic variation.

<25>

Accession Number

089041849

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Title

THE PALYNOLOGY OF TWO ARCHAEOLOGICAL SITES IN THE SOUTHEAST MISSOURI OZARKS USA.

Source

Plains Anthropologist 34 (126). 1989. 293-308.

Abstract

Palynological investigations of two archaeological sites.sbd.Round Spring Shelter, Round Spring Site 23SH19 and Gooseneck Site 23CT54 located in Shannon and Carter counties, Missouri.sbd.provide botanical information associated with Indian occupation. the pollen sequence from Round Spring Shelter suggests the presence of a pine-oak forest in the vicinity of Round Spring. Based on associated Middle Woodland artifacts, the pine-oak forest may be dated from approximately 500 B.C. and continues to the present. However, the pollen spectra from Gooseneck Site 23CT54 indicate a mixed oak-hickory forest in the locality for an Early Mississippian Naylor Phase occupation (ca. A.D. 650-850). The palynological data from the archaeological sites provide part of the Holocene vegetational record in an area previously unstudied.

<26>

Accession Number

084118261

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Title

PREDICTING GROWTH AND SUCCESS OF COPPICE-REGENERATED OAK STEMS.

Source

Forest Science 33 (3). 1987. 740-749.

Abstract

Logistic regression models were derived from data collected in the Missouri Ozarks USA to estimate the probabilities that 5-year-old stems of red oaks and white oaks in thinned and unthinned sprout clumps would attain a specified dbh at ages 12 and 30. In deriving each model, several success criteria based on selected future dbh were specified. A stem was considered "successful" for a particular criterion if it attained that dbh or larger, but considered a "failure" if it did not achieve that criterion because of either slow growth or mortality. Consequently, each model accounted for both growth and mortality probabilistically. Growth of survivors was also estimated using linear regression models. These models were developed for two species groups using data for stems that were alive at both the beginning (age 5) and end of a measurement period (ages 12 and 30). The logistic models indicated that height at age 5 was a significant predictor of competitive success of stems in subsequent years in stands with either thinned or unthinned clumps. Diameter of the parent stump was also significantly correlated with success, but only in stands where clumps were thinned. Results indicate that under the conditions of this study, which was conducted on a single site, stems with high success probabilities could be identified early in the life of this coppice-regenerated stand, and that early clump thinning in this stand increased success probabilities and diameter growth.

<27>

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Title
DISTRIBUTION OF GEOGRAPHICAL-EVOLUTIONARY RELATIONSHIPS OF CEDAR GLADE
ENDEMIC IN SOUTHEASTERN USA.

Source
Asb (Association of Southeastern Biologists) Bulletin 33 (4). 1986. 138-154.
Abstract

The cedar glade flora of the Southeast includes 29 taxa endemic or nearly-endemic to cedar glades; 10 of these are in the genus *Leavenworthia*. Twenty-two are restricted to glades in the Southeast, two occur in Southeast and in adjacent southern Indiana, two occur in the Southeast with extant populations north of the glacial boundary in Illinois, two have their centers of distribution in the Ozarks with disjunct populations in Middle Tennessee, and one is found in cedar glades of the Southeast, Ozarks, and southern Indiana and Ohio. Some of the endemics have their closest relatives west of the Mississippi River, while others are closely allied to eastern taxa. We suggest that the western taxa, or their ancestors, may have entered the Southeast from the Southwest and/or the Ozark Plateau, and later *Astragalus tennesseensis* and *Dalea foliosa* migrated from the Central Basin of Tennessee to the glaciated Midwest. The high degree of endemism in the southeastern cedar glades and the presence of taxa with and without close relatives suggest that the glades have served as sites of plant speciation for a long period of time.

<28>

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Title
ANALYSIS OF THE VEGETATION AND SOILS OF GLADES ON CALICO ROCK SANDSTONE IN
NORTHERN ARKANSAS USA.

Source
Bulletin of the Torrey Botanical Club 112 (1). 1985. 70-73.
Abstract

Twenty-five sandstone glade sites in the Arkansas Ozarks were surveyed for vegetation and soil characteristics. The soil factors were similar to those of other glade types reported in the literature with the exception that the Calico Rock glades had a wide range of soil pH. The mean soil depth was 4.2 cm; 86.4% of all soil measurements were less than 10 cm. *Juniperus virginiana* was the most common tree species, and the mean basal area for all trees was only 2.8 m²/ha. *Coreopsis grandiflora* and/or *Crotonopsis elliptica* were dominant or co-dominant on 76% of the sites, and grasses comprised 16% of the herbaceous species. Species richness was highest on neutral soils, but percent occurrence of cryptogamic vegetation decreased with increasing pH.

<29>

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Title

RESPONSES OF PLANTED NORTHERN RED OAK QUERCUS-RUBRA TO 3 OVERSTORY TREATMENTS.

Source

Canadian Journal of Forest Research 14 (4). 1984. 536-542.

Abstract

Northern red oak (*Q. rubra* L.) was planted in upland oak forests of the Missouri Ozarks USA. Plantings were made in 8 clearcut plots and in 16 plots thinned to 60% stocking. After 3 field growing seasons, the overstory was removed on one-half of the underplanted plots. The 2304 planted trees consisted of 4 classes of planting stock: small 1 + 0, large 1 + 0, 1 + 1, and container-grown. Shoots were clipped on 1/2 of the trees in each class. After 5 field growing seasons, average survival was 84%. Average heights of survivors were as follows: 118 cm for trees planted directly into clearcuts, 97 cm for underplanted-released trees, and 59 cm for underplanted-unreleased trees. Based on net shoot growth of trees after overstory removal, success probabilities were estimated using logistic regression analysis. The most successful trees were clipped 1 +1 stock with initial shoot diameters (2 cm above the root collar) of 10 mm or more that were underplanted and subsequently released. For clipped 1 + 1 stock, success probabilities for a success criterion of 30 cm net height growth per year after overstory removal ranged 0.61-0.77 for 10-16 mm diameter trees; for a success criterion of 40 cm, success probabilities were 0.42-0.63, respectively.