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A Summary of the Illinois Flora Based on the Illinois Plant Information Network

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ABSTRACT

The Illinois Plant Information Network (ILPIN), a species-based database on the flora of Illinois, is useful for assessing botanical diversity in Illinois and surrounding states. All known vascular plant taxa from Illinois (more than 3,200) are included. It contains county distributions (totaling nearly 90,000) for each taxon and information on the taxonomy, ecology, biology, and ecodistribution of each. Summary maps and tables on Illinois flora are generated easily, that include the number of taxa by county or subsets such as number of threatened and endangered species, number of exotics, number of native, forest-associated species, and other data. The database also provides information on regional ecological factors associated with the flora, via geographic information system (GIS) overlay analysis and statistics.

INTRODUCTION

The Sustainable Biosphere Initiative (SBI) of the Ecological Society of America (Lubchenco et al. 1991) focuses on three major issues: global change, biological diversity, and sustainable ecological systems. A critical research need for each of these issues is the availability of long-term data on organisms and their habitats. Lubchenco et al. (1991) state that with the increasing impacts of humans on the environment, the urgency in understanding "the ecological determinants and consequences of diversity... and the effects of global and regional change on biological diversity" also is increasing (see also Peters and Lovejoy 1992). We must move from the conservation of only single species to the concept of ecosystem conservation, particularly as so many component species are poorly known with respect to their individual autecology and because we would be unsuccessful at optimally managing for more that a few species simultaneously

(Burton et al. 1992; Franklin 1993). For ecosystem conservation, data are needed on all elements of diversity.

There also is a need for information systems that track the status and known information about flora (Bisby et al. 1993). These systems can be of even greater utility when linked to a geographic information system (GIS) (Davis et al. 1990). Currently, there are few large-area databases that are suitable for studies of ecosystem conservation.

There are three approaches to databases that help address issues of integrated analyses of botanical and ecosystem data. Investigators can: (1) record point localities of individual plant sitings or collections, (2) make synthetic summaries of plant collections (e.g., county records), or (3) record specimens by habitat or intrinsic features of the land (Morse et al. 1981).

In the United States, the information database for rare species is expanding, primarily due to the Endangered Species Program of the USDI Fish and Wildlife Service (USDI Department of Interior, Fish and Wild. Serv. 1990) and State Natural Heritage Programs initiated by The Nature Conservancy (Sanders 1978). The former database, which follows the synthetic approach and catalogs species for each county, was used in conjunction with land-type association data to assess species endangerment patterns across the United States (Flather & Joyce 1994).

The Nature Conservancy uses the point-locality approach to catalog critical elements of rare plants, animals, and communities. This approach is used extensively to assess threats and develop management strategies (e.g., Jenkins 1985; Master 1991; Morse et al. 1993). These two databases focus only on the endangered or rare elements of diversity.

Databases that catalog information on the entire flora are less developed. Kartesz (1993) cataloged more than 15,000 taxa of vascular plants, with a state level of spatial resolution for the United States, Canada, and Greenland. The USDA Soil Conservation Service along with other agencies has cataloged, in total across the U.S., more than 50,000 vascular and nonvascular plant species (USDA Soil Conservation Service 1982). Szaro (1992) summarized biological diversity related to forested ecosystems across North America.

These databases provide only limited ecological, biological, and geographical information about the species. Additional pertinent information about each taxon is needed so that more thorough ecosystem assessments can be conducted. Field botanists must be given the opportunity to enhance the distributional aspects of the databases by increasing routine collections across their geographic range. In addition, funds are needed to verify and automate the herbaria and other smaller databases housed in both private and institutional collections.

Many people believe that Illinois is poor in species because of its abundance of agricultural and urban centers. In fact, Illinois has a wide diversity of plant communities because of its geography, climate, and geologic history. Plant taxa in the state are abundant because of the mixing of species from a variety of floristic regions, including western prairies, Ozarkian components, southern coastal plain environments,

northwestern driftless regions, Appalachian flora, eastern deciduous forests, northern boreal components, and cosmopolitan exotic sources. This multitude of sources from which species have invaded and the diversity of habitats north to south result in more than 3,200 plant species in Illinois, more than in any other Midwestern state (Kartesz 1992). Because of this diversity of species origins, Illinois' flora is similar to that of several Midwestern states, so any analysis of its flora likely will apply beyond the state's borders.

The flora of Illinois is well known and compiled, compared to many other states, due largely to the efforts of several individuals and their students. These include Robert Mohlenbrock of Southern Illinois University, who published extensively on the flora of Illinois (e.g., Mohlenbrock 1986), Floyd Swink and Gerould Wilhelm of the Morton Arboretum, who studied the plants of the Chicago region (Swink & Wilhelm 1994), and Robert Evers of the Illinois Natural History Survey, who collected more than 180,000 specimens across the state (Evers 1955).

The objectives of this paper are to introduce the ILPIN and its capabilities for integrating information about the flora of Illinois, and to summarize some of the characteristics of the Illinois flora.

METHODS

ILPIN database

ILPIN was developed and continues to reside at the Illinois Natural History Survey in Champaign. It was initially patterned after a project by the USDI Fish and Wildlife Service in Fort Collins, Colorado. Called the Plant Information Network (PIN), the project was initiated to provide information on the species of Colorado, Utah, Montana, Wyoming, and North Dakota (Vories & Sims 1977). This system was modified and expanded to include Illinois flora beginning in 1983. (The recording forms, which indicates the variables cataloged in ILPIN and the descriptions of each variable, are available from the authors, but a review of the Appendix will give some indication as to the details in the database). The database used was the geographic information system software, ARC/INFO (ESRI, 1991), which allowed storage, retrieval, and manipulation of tabular data in INFO, and spatial (distributional) information in ARC. During the ensuing years, data were compiled from a number of resources to fill out the database. Some categories contain extensive data while others have little information entered. However, the intent was not to attain a complete database, but to encode known information and provide a basis for further research. Extensive programming eased data input (with error checking), extraction, and viewing or printing (see the Appendix for an example output).

Summarizing ILPIN information

Many of the variables listed in the Appendix were queried and summarized from ILPIN. For this paper, only representative summaries were possible. These include endangered/threatened status, commonness, habit, natural community preference, weediness, life cycle, leaf arrangement, and edibility. Data were summarized and

graphed according to four subsets: (1) entire flora; (2) native flora; (3) flora listed by Illinois or the U.S. government as threatened or endangered (Herkert 1991); and (4) flora classed as trees or shrubs.

RESULTS AND DISCUSSION

Information Available from ILPIN

Although far from being a completed database, ILPIN provides rapid access to compiled information on the species of Illinois and surrounding states. There are 131 fields of information available for data on each of 3,208 taxa found in the state. An example of data output for persimmon (*Diospyros virginiana* L.), is shown in the Appendix. Example queries (and their answers, noting that some answers represent a minimum number since not all taxa have complete information) include:

1. How many native herb taxa have culinary (99) or medicinal (94) uses?
2. How many Champaign County species are edible (242)?
3. How many forest-associated exotic species have been reported for only one or two counties (32)?
4. How many yellow-flowered taxa might appear in woodlands in Cook County (Chicago area) (186)? How many are common (70)?
5. How many trees have edible parts (89)?
6. What percentage of simple-leaved taxa also have entire leaf margins (67%) or doubly serrate (1%) margins?
7. How many prairie-related species have basal leaves (119)?
8. What percentage of the prairie taxa are monocots (35%) or woody dicots (5%)?
9. What percentage of the threatened and endangered taxa for Illinois could be associated with wetlands (47%)?
10. What percentage of the Illinois flora are C_4 taxa from forests (3%) or prairies (6%)?
11. What are the 40 families with the highest number of taxa per family (Table 1)?
12. What are the 40 most commonly reported exotic species in Illinois (Table 2)?

Summarizing ILPIN information

Besides these queries, individual fields are summarized easily with the ILPIN database. As examples, summaries are presented for eight characteristics of the flora. In each case, the data are summarized for the entire reported flora (3,208 taxa), native species only (2,309 taxa), threatened and endangered species (T&E) only (356 taxa), and trees and shrubs only (467 taxa). For several of the pie-chart summaries (Fig. 1), a taxon may be in more than one category so that the total number of taxa represented is greater than the numbers listed above.

In addition to the taxa reported in ILPIN, there are as many as 67 taxa that are presumed extirpated (Bowles et al. 1991; Post 1991; John Taft, pers. commun.).

Threatened/Endangered Status. About 12% of the entire flora and 15% of the native Illinois flora are listed as threatened or endangered by the state and/or the US government (Fig. 1A). Of these, only six taxa (0.2% of the entire flora) currently are listed as threatened or endangered by the federal government. There is not a high degree of endemism in Illinois, as the physical geography of surrounding states is similar to that of

Illinois. Therefore, most of the state-listed taxa represent those at the edge of their overall range (Herkert 1991); indeed, some the taxa may not even be that rare in surrounding states. However, a relatively high proportion of the flora, totalling 366 taxa, is in danger of extirpation from the state. Roughly the same proportion of trees and shrubs are as endangered or threatened status as the flora as a whole (Fig. 1A). One species, *Thismia americana*, is presumed extinct, though it is still listed because it is possible that this 1-cm tall saprophyte may persist in some sand prairie habitat in the Chicago region (Herkert 1991).

Commonness. There are four categories in this field: (1) rare (rarely found and sparse), (2) uncommon (localized distribution or sparse), (3) occasional (common in localized patches), or (4) common (widely distributed with high abundance). Only about 15% of the flora (entire flora or native flora) can be considered common in Illinois (Fig. 1B). Of course, most of the threatened and endangered (T&E) taxa are rare (90%), with most of the remaining taxa classed as uncommon. Slightly higher percentages of taxa are classed as rare for trees and shrubs (41%) versus native (31%) or entire flora (37%). This trend can be attributed to the large number of trees and shrubs that have escaped from cultivation, especially in the Chicago region (Swink & Wilhelm 1994). Many introduced trees and shrubs have become naturalized outside of their original setting (e.g., nurseries and backyards), but remain rare in occurrence.

Habit. This field pertains to the growth form of the plant: tree, shrub, vine, liana, forb, and grasslike. Eighty-one taxa may be either a shrub or a tree depending on conditions. About 60% of the entire flora and native flora are forbs in habit, followed by about 20% as grasslike (Fig. 1C). Compared to the native flora, T&E flora includes a higher proportion of grasslike taxa and a lower proportion of tree taxa. Obviously, trees and shrubs have tree or shrub habits, although a few taxa can also occur as lianas.

Natural Community Preference. This item places a taxon in a hierarchical framework of natural communities. For example, a taxon found only on dry sand forests would be placed at the third level of the hierarchy and also would be categorized both as a sand forest and a forest taxon (see Appendix for an example). The first level of the hierarchy, summarized here, includes eight general community types: forest, prairie, savanna, wetland, lake and pond, stream, primary, and cultural communities. A taxon can be placed in more than one community type, as many species live, for example, in both prairies and savannas. When the entire flora is considered, the cultural communities (human-disturbed systems) have the most taxa (1,648), followed by forest systems (1,588) and wetlands (1,264) (Fig. 1D). However, when only native taxa or T&E taxa are considered, the number of taxa in cultural communities falls to fourth or fifth place behind forests, wetlands, primary (including glades, bluffs, dunes, beaches), and prairie communities. As expected, the largest number of trees and shrubs are found in forest communities, though surprisingly high numbers of trees and shrubs also are found in cultural (many escapes) and wetland habitats.

Weediness. This field attempts to catalog the taxa if it is considered "undesirable, unattractive, or troublesome". Obviously, this is a subjective classification. For ILPIN, we have chosen to classify a species as a weed only if it is classed as such in the literature (e.g., Illinois Agriculture Experiment Station 1981). As a result, there is a preponderance

of "unknown" species in Fig. 1E. Within the entire flora, 15.7% of all species are classed as weedy compared to 7.8% of the natives, 9.6% of the trees and shrubs, and 0% of the T&E species. Many of the weedy trees and shrubs are escapes from cultivation, especially in the Chicago region. A few Illinois T&E species, at the edge of their range in Illinois, might be classified as 'weedy' in other states because they are generally fugitive in nature (for example, on sand dunes). However, they are not classed as weedy in this analysis. Interestingly, 35% of the colonizing weeds (easily established in disturbed environments) and 37% of the economic weeds (cause economic loss) are native to Illinois. However, the exotic weeds tend to present much more of a problem for managers of natural areas (Bratton 1982; Harty 1986). People are encouraged to become aware of the exotic troublemakers in their locality and help eliminate them.

Life Cycle. This field catalogs a taxon's reproductive cycle, which can be perennial, biennial, or annual (Fig. 1F). In some instances, a species can be more than one of the above. All trees and shrubs are perennial, as are 80% or more of the native and T&E floras. For the entire flora, however, the proportion of perennials is lower (71%), because 44% of the introduced flora are annuals. These annual, exotic species are commonly excellent fugitive species that thrive in disturbed locations.

Leaf Arrangement. This field provides an example of the taxonomic characteristics embedded into ILPIN. With additional fields and programming, the database also could be used as an aid in species identification. Several computer programs are available that assist in the identification of portions of the globe's flora. Leaf arrangement simply identifies the placement of leaves on a stem: alternate, opposite, whorled, or basal. For trees and shrubs, 99% of the taxa have either alternate leaves (76.8%) or opposite (21.9%) leaves. This trend contrasts to that in the native and T&E floras, where 17 and 22 percent, respectively, have whorled or basal leaves (Fig. 1G). By far the most common leaf arrangement is the alternate type.

Edibility. This field summarizes the potential for a plant to be edible by humans. Classes are: some part of the plant is edible; plant is edible but only during certain seasons or after certain preparations; plant is inedible; some part of the plant is poisonous. Again, many plants are not rated as there were insufficient numbers of individuals willing to taste all of the species. Instead, we relied on a handful of references related to plant edibility (e.g., Medsger 1939; Fernald et al. 1958; Kingsbury 1964). For all taxa, native taxa, and T&E taxa, roughly 18% of the flora is edible at least at some portion of the year (Fig. 1H). This figure jumps to 30% (137 taxa) when only trees and shrubs are considered. Part of this increase can be attributed to the better known status of the trees and shrubs. More than 40% of the total known poisonous plants in the Illinois flora are introduced species; the exotics not only are proportionately more "weedy" than the native flora but also more poisonous to humans.

CONCLUSIONS

The Illinois Plant Information Network allows rapid analysis of Illinois flora in a number of ways that previously were impractical. Summary assessments of a host of variables can provide insights into the nature of the flora. More importantly, ILPIN provides a mechanism to identify the gaps of information concerning the taxa of the state, e.g.,

where should the limited resources in systematics and ecology be placed for the greatest payback?

Besides describing the ILPIN data base and its capabilities, we have summarized some general characteristics of the Illinois flora, which would be until now, extremely tedious to determine. As examples, we have shown, for the entire Illinois flora, that: (1) about 12% of the taxa are threatened or endangered; (2) only about 15% of the flora is common; (3) 61% are forbs; (4) nearly half of the flora are found in either cultural or forest community types; (5) 480 taxa, so far, have been determined to be either colonizing or economic weeds; (6) 71% of the flora is perennial in life cycle; (7) 65% of the flora has an alternate leaf arrangement; and (8) there is a wide variety of taxa (nearly 600 taxa) with edible plant parts at least some part of the year or with appropriate cooking. It is hoped that the more familiar people become with their surrounding flora, the more good citizenship can be practiced with respect to the wide diversity of taxa in Illinois.

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Figure 1A. Summaries from the Illinois Plant Information Network - **Threatened/Endangered Status**

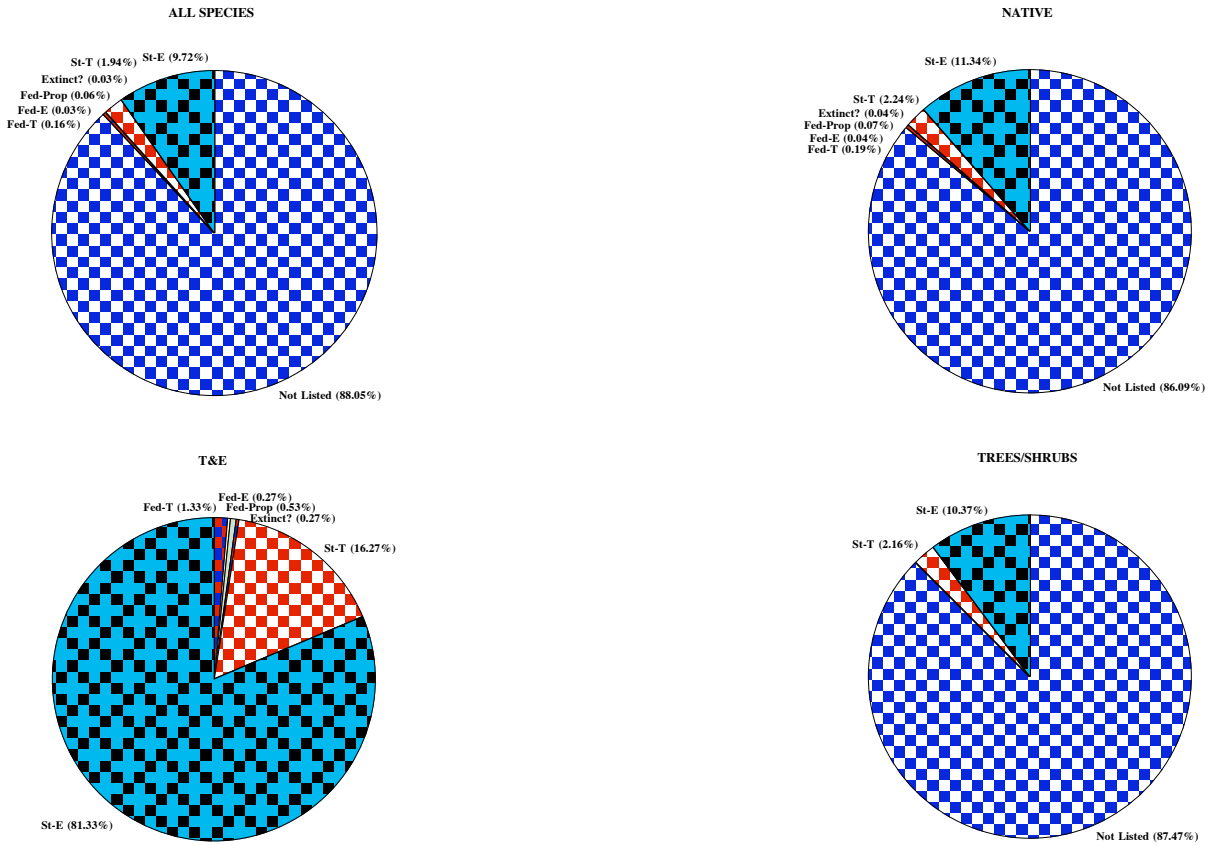

Figure 1B. Summaries from the Illinois Plant Information Network - **Commonness**

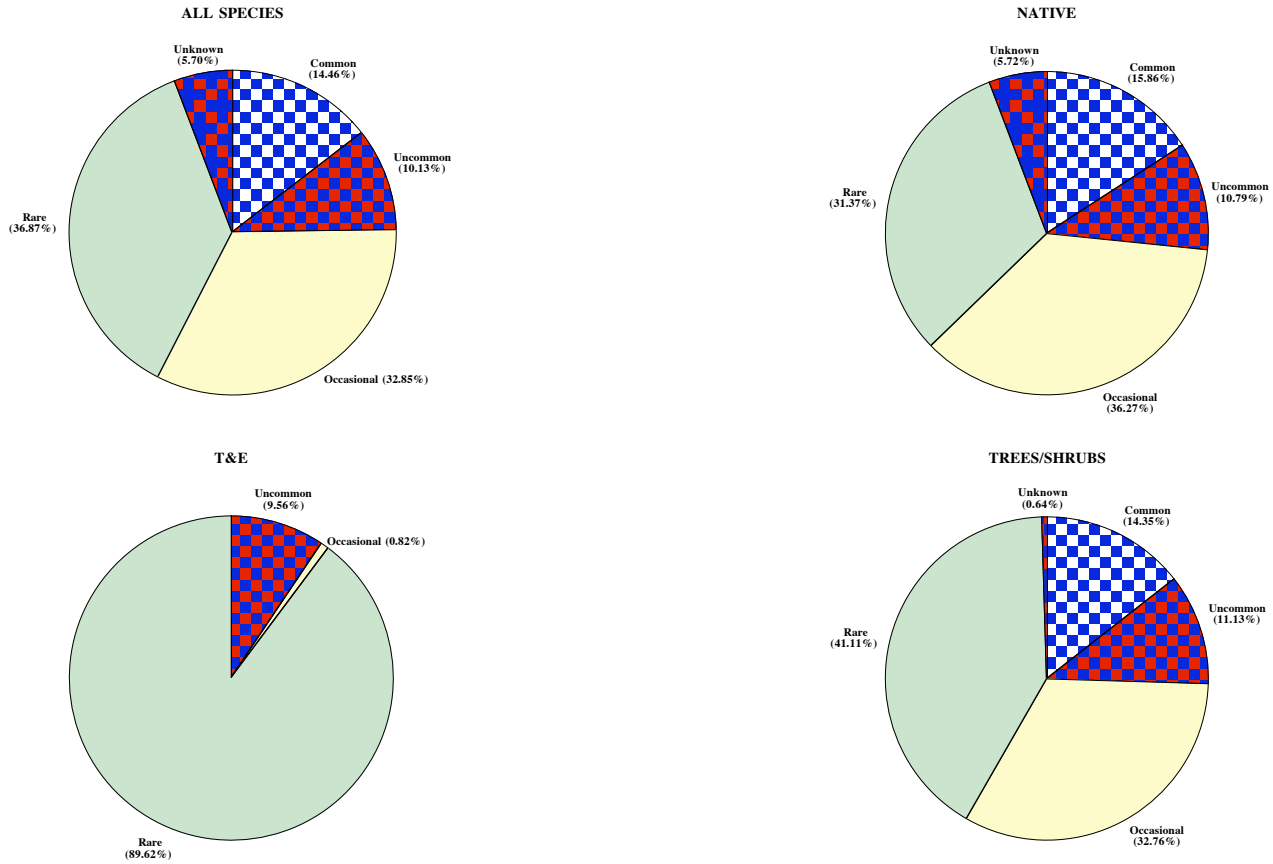

Figure 1C. Summaries from the Illinois Plant Information Network - **Habit**

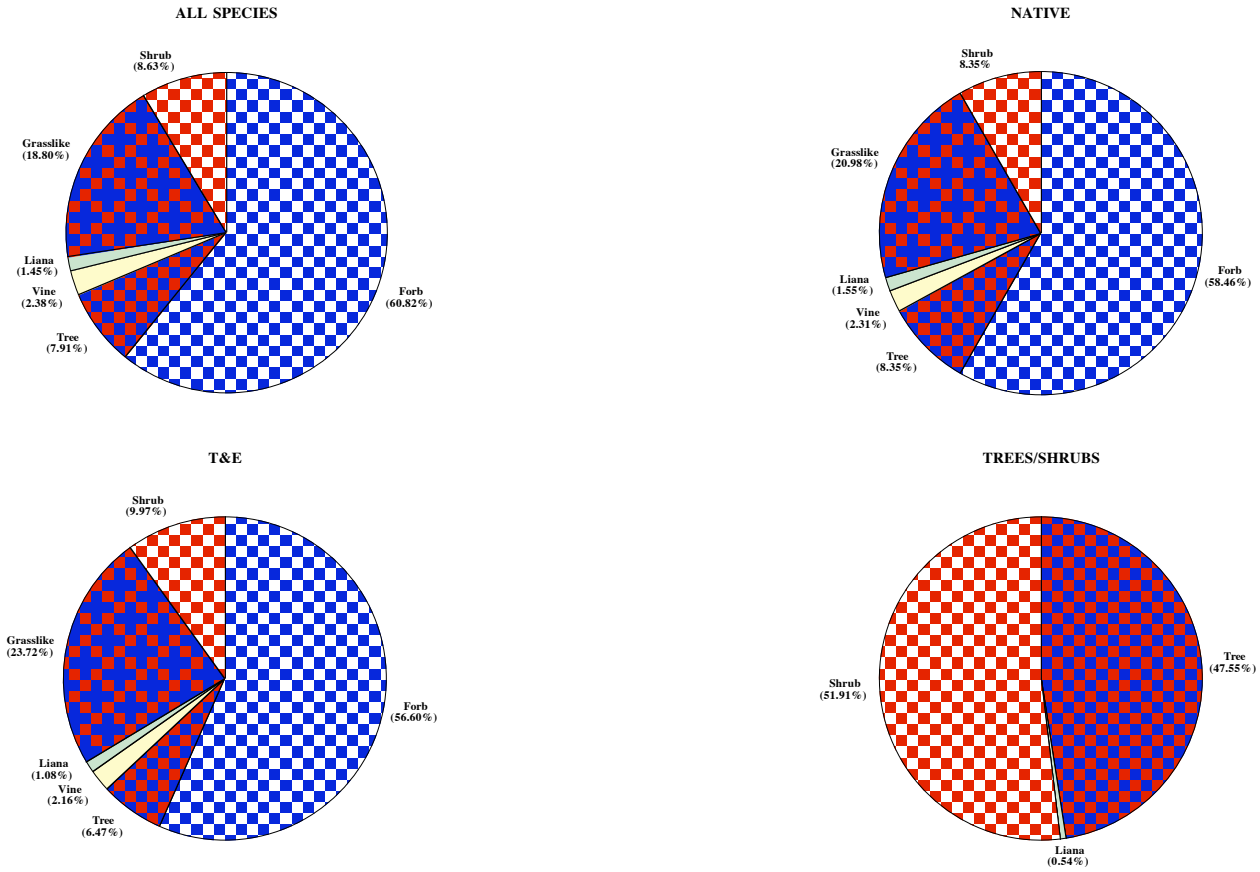

Figure 1D. Summaries from the Illinois Plant Information Network - **Natural Community Preference**

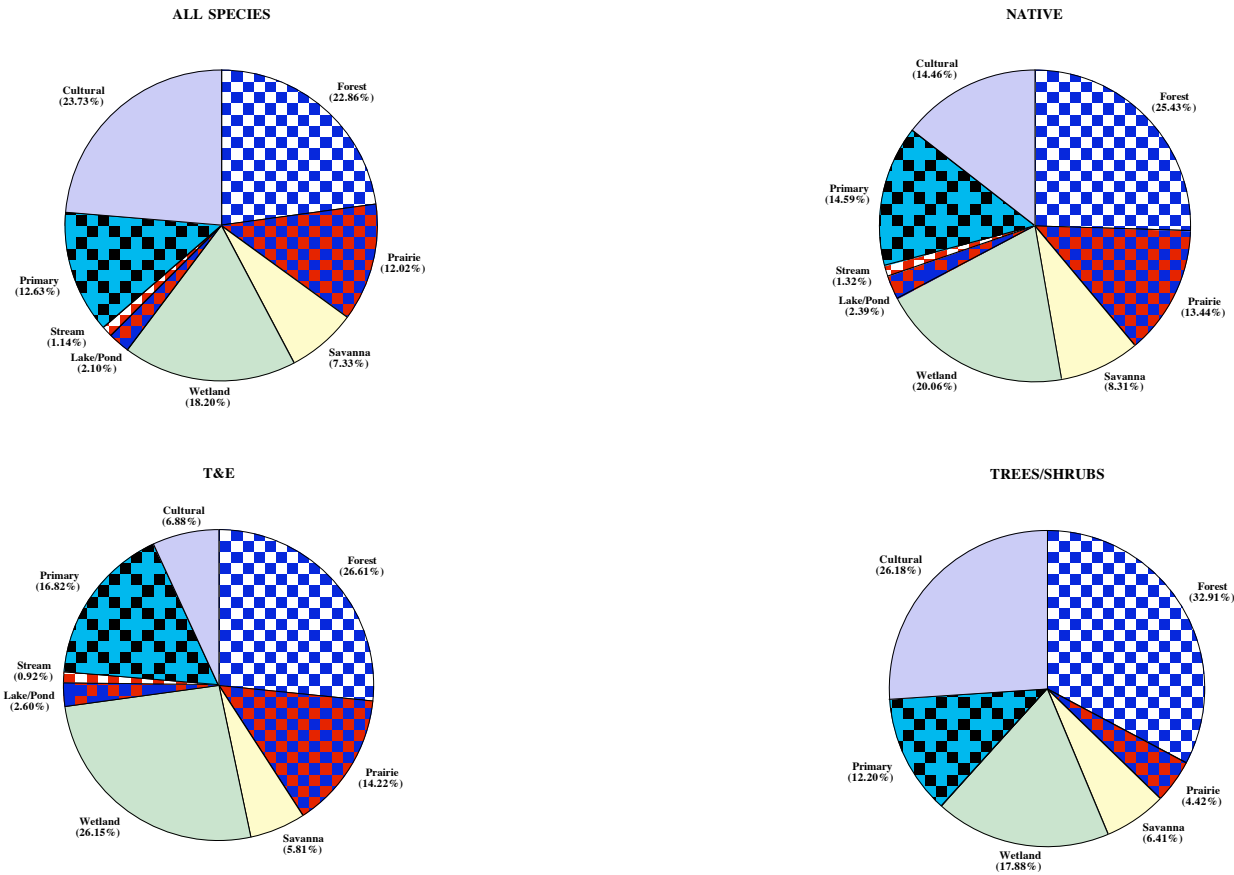

Figure 1E. Summaries from the Illinois Plant Information Network - **Weediness**

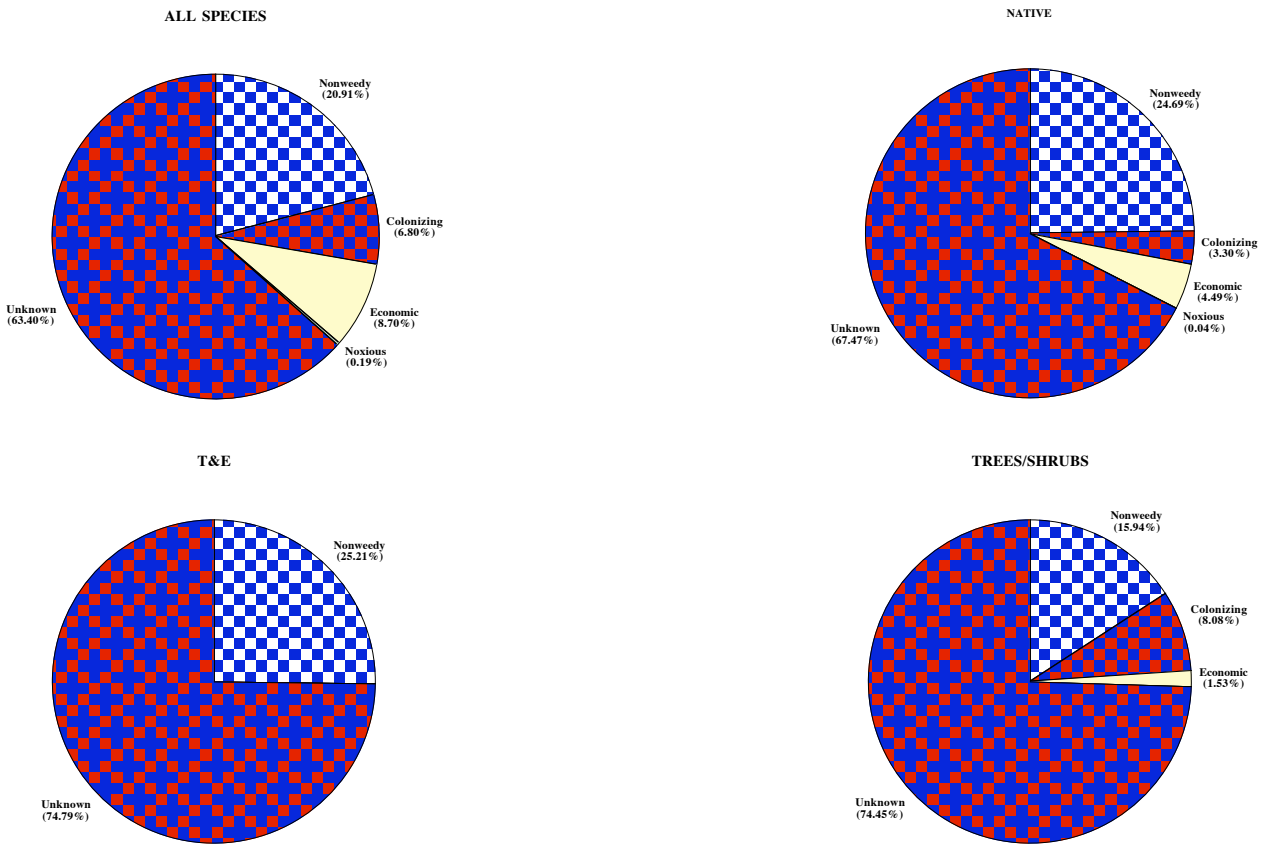

Figure 1F. Summaries from the Illinois Plant Information Network - **Life Cycle**

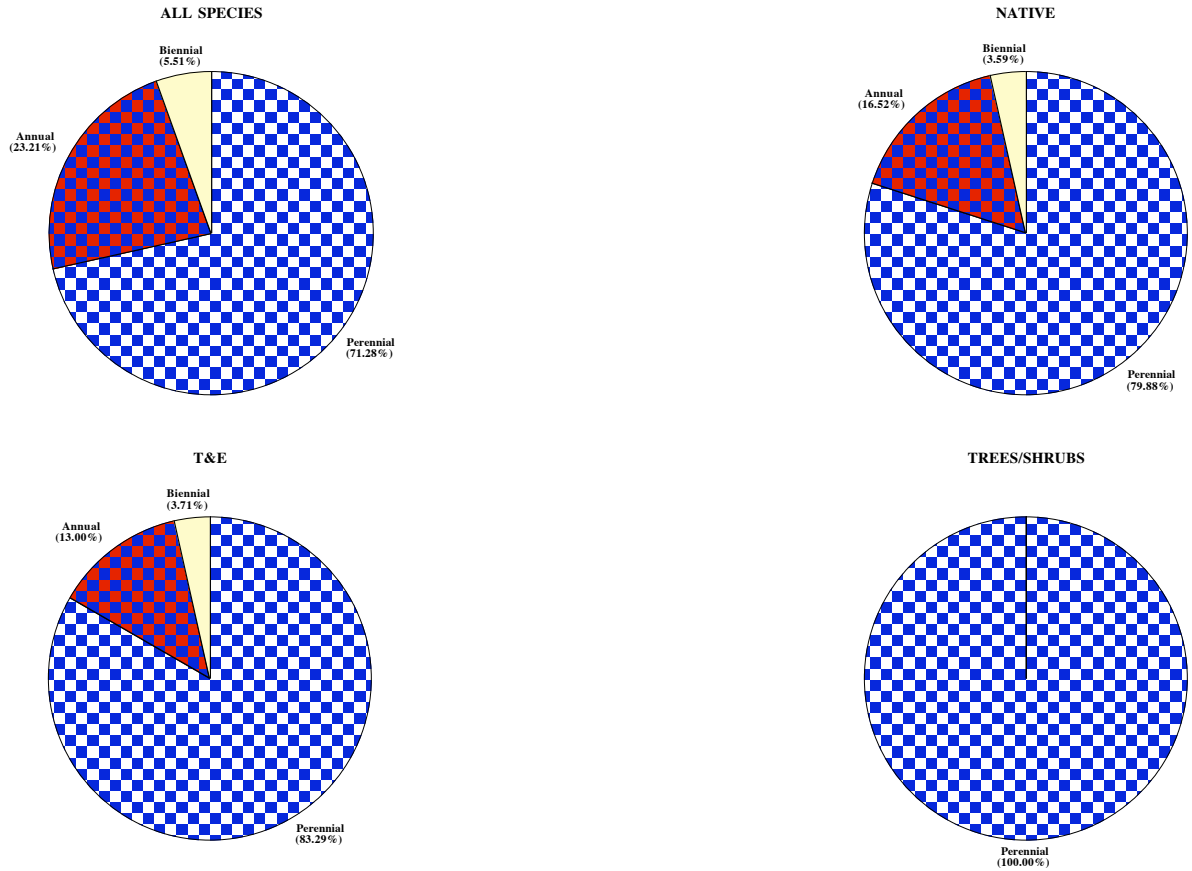

Figure 1G. Summaries from the Illinois Plant Information Network - **Leaf Arrangement**

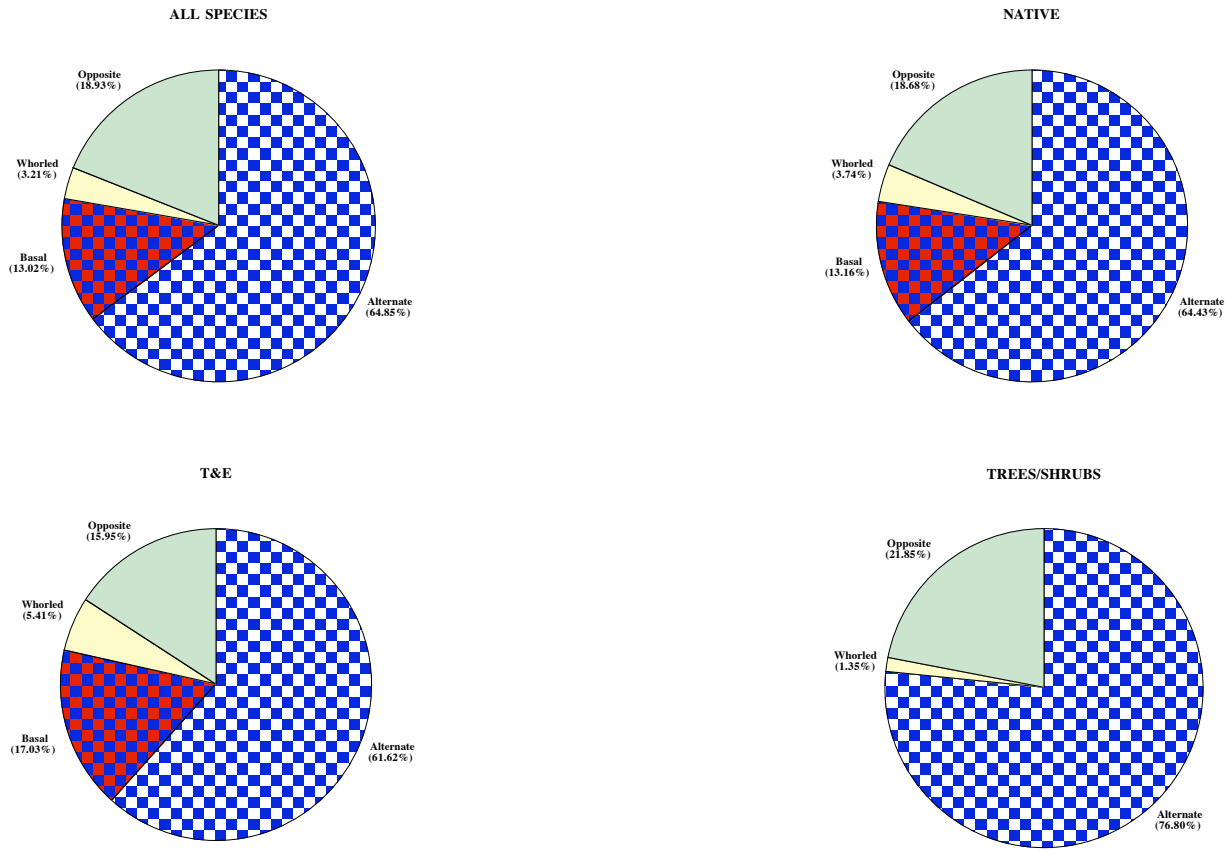

Figure 1H. Summaries from the Illinois Plant Information Network - **Human Edibility**

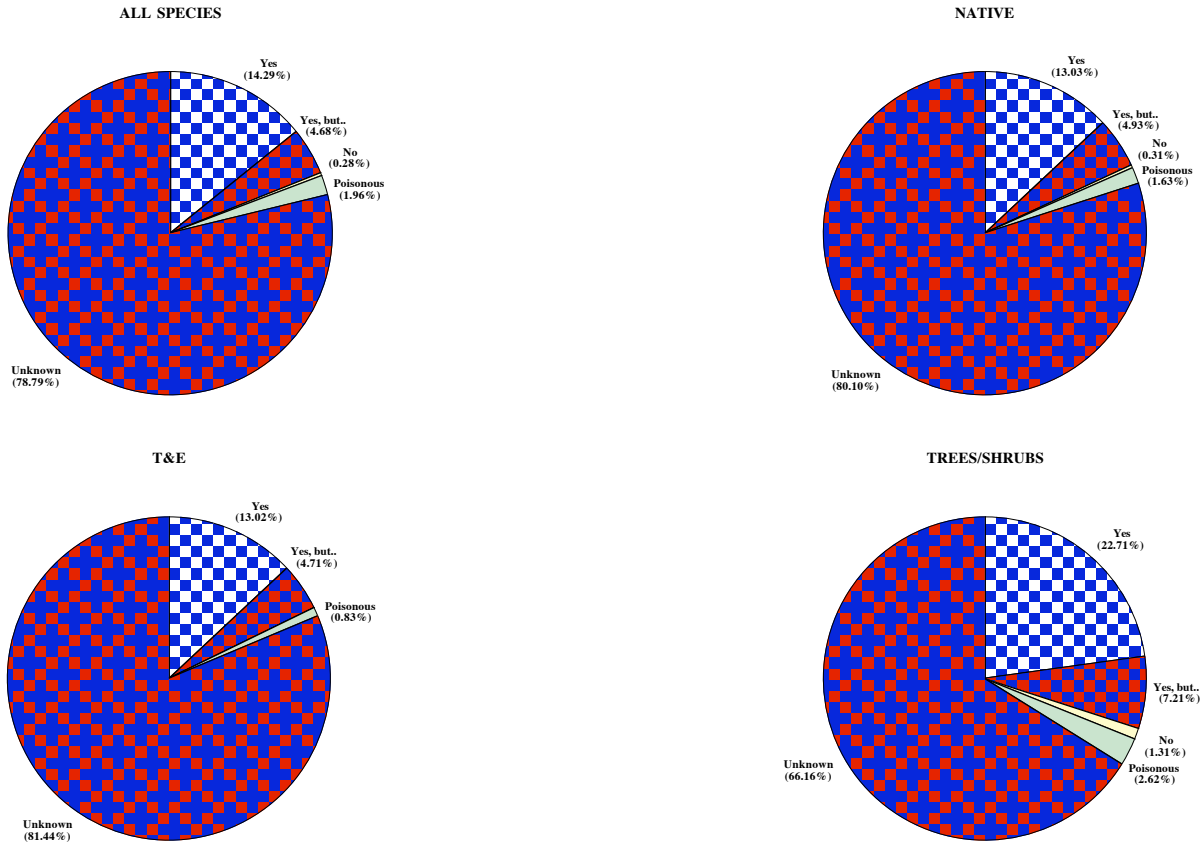

Table 1. Number of taxa recorded per family for top 40 families in Illinois (172 families represented in Illinois flora)

ASTERACEAE	345	ONAGRACEAE	35
POACEAE	341	BORAGINACEAE	34
CYPERACEAE	252	VIOLACEAE	32
ROSACEAE	159	RUBIACEAE	32
FABACEAE	132	JUNCACEAE	28
LAMIACEAE	99	HYPERICACEAE	26
BRASSICACEAE	91	MALVACEAE	25
SCROPHULARIACEAE	83	PRIMULACEAE	25
RANUNCULACEAE	73	FAGACEAE	25
LILIACEAE	71	ASCLEPIADACEAE	25
APIACEAE	55	PAPAVERACEAE	23
POLYGONACEAE	52	POTAMOGETONACEAE	22
CARYOPHYLLACEAE	51	ERICACEAE	18
ORCHIDACEAE	49	JUGLANDACEAE	18
ASPLENIACEAE	44	CAMPANULACEAE	18
EUPHORBIACEAE	43	IRIDACEAE	17
CAPRIFOLIACEAE	40	POLEMONIACEAE	17
SALICACEAE	40	AMARANTHACEAE	17
SOLANACEAE	40	VERBENACEAE	17
CHENOPODIACEAE	36	CONVOLVULACEAE	17

Table 2. Illinois exotic taxa (top 40 taxa) and number of counties reported per taxa (of a total of 102 counties)

Achillea millefolium	102	*Rumex acetosella*	102
Allium vineale	102	*Setaria faberi*	102
Bromus inermis	102	*Setaria glauca*	102
Bromus tectorum	102	*Setaria viridis*	102
Capsella bursa-pastoris	102	*Stellaria media*	102
Cerastium vulgatum	102	*Taraxacum officinale*	102
Dactylis glomerata	102	*Trifolium hybridum*	102
Eragrostis cilianensis	102	*Trifolium pratense*	102
Festuca pratensis	102	*Trifolium repens*	102
Lactuca serriola	102	*Verbascum thapsus*	102
Medicago lupulina	102	*Veronica arvensis*	102
Medicago sativa	102	*Anthemis cotula*	99
Melilotus alba	102	*Mirabilis nyctaginea*	95
Melilotus officinalis	102	*Saponaria officinalis*	95
Pastinaca sativa	102	*Cichorium intybus*	94
Phleum pratense	102	*Rumex crispus*	94
Plantago lanceolata	102	*Maclura pomifera*	93
Poa compressa	102	*Potentilla recta*	92
Poa pratensis	102	*Mollugo verticillatus*	90
Portulaca oleracea	102	*Barbarea vulgaris arcuata*	88

APPENDIX
Example output from Illinois Plant Information Network

ENTER SCIENTIFIC NAME (FIRST LETTER CAPITALIZED)
Diospyros virginiana
ILLINOIS PLANT INFORMATION NETWORK
Developed by L. Iverson, Center for Biodiversity, INHS

INFORMATION ON SPECIES: Diospyros virginiana

CLASS: DICOTYLEDENAE
ORDER: EBENALES
FAMILY: EBENACEAE
SCIENTIFIC NAME: Diospyros virginiana
AUTHORITY: L.

COMMON NAMES:
PERSIMMON
POSSUMWOOD

SYNONOMY:
Diospyros pubescens Pursh
Diospyros virginiana L. var. pubescens (Pursh) Dippel
Diospyros virginiana L. var. platycarpa Sarg.
Diospyros virginiana L. var. platycarpa Sarg. f. atra Sarg.

RECORD NUMBER 804

CODES: SCS- DIVI5 ILPIN- 6627NTRN TAXA-CODE- 50 5150 10 5 5 0 0 0 0

NATURAL COMMUNITIES:
FOREST
UPLAND FOREST
DRY
DRY-MESIC
MESIC
FLOODPLAIN FOREST
MESIC
WET-MESIC
FLATWOODS
SOUTHERN
PRAIRIE
HILL PRAIRIE
LOESS
SAVANNA
BARREN

- PRIMARY
  - GLADE
    - SANDSTONE
    - LIMESTONE
- CULTURAL
  - AGRICULTURAL FIELD
    - CROPLAND
    - PASTURELAND
    - FIELD DIVISION
  - SUCCESSIONAL FIELD
    - ABANDONED CROPLAND
      - EARLY
      - MIDDLE
      - LATE
    - ABANDONED FORAGELAND
      - EARLY
      - MIDDLE
      - LATE
  - DEVELOPED LAND
  - PLANTATION
  - RESTORATION
    - FOREST
  - MINED LAND
    - VEGETATED

SAF FOREST COVER TYPE:

- CENTRAL
  - Other Central Types
    - listed
    - Sassafras - Persimmon

NATURAL DIVISION:

- Grand Prairie
  - Grand Prairie
  - Springfield
- Upper Miss. and Ill. R. Bottomlands
  - Illinois River
  - Mississippi River
- Miss. and Ill. R. Sand Areas
  - Illinois River
- Western Forest Prairie
  - Galesburg
  - Carlinville
- Middle Mississippi Border
  - Glaciated
  - Driftless

Southern Till Plain
Effingham Plain
Mt. Vernon Hill Country
Wabash Border
Bottomlands
Southern Uplands
Ozark
Northern
Central
Southern
Lower Miss. R. Bottomlands
Northern
Southern
Shawnee Hills
Greater Shawnee Hills
Lesser Shawnee Hills
Coastal Plain
Cretaceous Hills
Bottomlands

COUNTIES:

ADAMS	ALEXANDER	BOND	BROWN	CALHOUN
CASS	CHAMPAIGN	CHRISTIAN	CLARK	CLAY
CLINTON	COLES	CRAWFORD	CUMBERLAND	DOUGLAS
EDGAR	EDWARDS	EFFINGHAM	FAYETTE	FRANKLIN
FULTON	GALLATIN	GREENE	HAMILTON	HANCOCK
HARDIN	JACKSON	JASPER	JEFFERSON	JERSEY
JOHNSON	LAWRENCE	MCDONOUGH	MACON	MACOUPIN
MADISON	MARION	MASON	MASSAC	MENARD
MONROE	MONTGOMERY	MORGAN	MOULTRIE	PEORIA
PERRY	PIATT	PIKE	POPE	PULASKI
RANDOLPH	RICHLAND	ST. CLAIR	SALINE	SANGAMON
SCHUYLER	SCOTT	SHELBY	TAZEWELL	UNION
WABASH	WASHINGTON	WAYNE	WHITE	WILLIAMSON

GROWTH FORM: Dicot-woody

TAXONOMIC CHARACTERISTICS:
ROOTS: Primary
LEAF ARRANGEMENT: Alternate
LEAF TYPE: Simple
LEAF MARGIN: Entire
LEAF VENATION: Pinnate
LEAF SHAPE: Oblong Ovate Oval
INFLORESCENCE: Dischasium Solitary- few
FLOWER MEROUS: 4

FLOWER STRUCTURE: Incomplete Regular
FLOWER COLOR: Yellow White
FLOWER PLACEMENT: Hypogynous
FRUIT: Berry

DISTINGUISHING CHARACTERISTIC COMMENTS:
Flowers are occasionally 5-merous. Pistillate flowers solitary, staminate flowers cymose (Spongberg, 1977).

GEOGRAPHIC INFORMATION:
ORIGIN: Native

POPULATION DYNAMICS:
STATE STATUS: Not listed
FEDERAL STATUS: Not listed
COMMONNESS: Occasional
ENDEMIC: NOT-ENDEMIC

BIOLOGIC:
HABIT: Tree
LIFE CYCLE: Perennial
REPRODUCTION: Sexual Vegetative
FLOWERING PERIOD:
MONTH BEGINNING- 5 MONTH END- 6
TROPHIC STATUS: Autotrophic
C02 FIXATION: C3
SEX: Unisexual -dioecious

BIOLOGIC COMMENTS:
Occasionally individuals produce both staminate and pistillate flowers. Perfect flowers are rarely formed. Seedless persimmons are sometimes formed through parthenocarpy (Spongberg, 1979). Two chromosome races of persimmon exist: 2n = 60 and 2n = 90 (Baldwin and Culp, 1941).

ENVIRONMENTAL RELATIONSHIPS:
GROWTH OF SPECIES IN VARIOUS CONDITIONS: No data entered

HABITAT: Moist Dry Xeric

FUNCTIONAL RELATIONSHIPS:
MAJOR DISPERSAL AGENTS: MAMMAL -internal
MAJOR POLLINATION AGENT: INSECT bee

HUMAN RELATIONSHIP DATA:
EDIBLE: Yes
SHOWY FLOWERS: NO LANDSCAPING: YES AMOUNT: Medium
CHEMICAL SOURCE VALUE: Yes

HUMAN FACTOR COMMENTS:
The edible fruit can be used to make pudding, syrup, and vinegar. The seeds can be roasted and used as a substitute for coffee. The dried leaves, which are high in vitamin C content, can be used to make a tea (Fernald et al., 1958). Wood of persimmon contains extracts that are toxic to termites (Carter et al., 1978).

WILDLIFE AND LIVESTOCK INFORMATION:
FOOD VALUE:
DEER VALUE: Good - Fruit Leaves Stems Buds
UPLAND GAME VALUE: Good - Fruit Leaves Buds
WATERFOWL VALUE: Unknown
SMALL NON-GAME BIRD VALUE: Good - Fruit
SMALL MAMMAL VALUE: Good - Fruit
AQUATIC MAMMAL VALUE: Unknown
FISH VALUE: Unknown
COVER VALUE: No data entered

LIVESTOCK PALATABILITY DATA:
CATTLE FORAGE: No SHEEP FORAGE: No data HORSE FORAGE: No data
GOAT FORAGE: No data ENERGY VALUE: No data PROTEIN VALUE: No data
POISONOUS (LIVESTOCK): No data entered
LIVESTOCK COMMENTS:
Foliage is avoided by cattle (Steyermark, 1963).

REVEGETATION PLANTINGS:
ESTABLISHMENT REQUIREMENTS: Easy
SHORT-TERM REVEGETATION POTENTIAL: Poor

LONG-TERM REVEGETATION POTENTIAL: Good
WEEDINESS: COLONIZING
SEED AVAILABILITY: Good

PROCUREMENT COMMENTS:
Seed company numbers: 14,18,19,21,27,28.

PROPAGATION COMMENTS:
Form - seedlings.

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END OF DATA FOR SPECIES Diospyros virginiana