

AN ASSESSMENT OF INVASIVE STATUS OF NON-NATIVE VASCULAR PLANT SPECIES IN OKLAHOMA

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ABSTRACT

The proliferation of non-native invasive species globally has created ecologic and economic duress. The Convention on Biological Diversity has called for the identification and prioritization of invasive non-native species by 2020. Although numerous ranking methodologies exist to meet this goal, the data required are often lacking for most taxa in a region. I used the Fundamental Invasiveness Index to assess the invasive potential of 436 non-native species of vascular plants in Oklahoma. It evaluates taxa based on five criteria: (1) nativity, (2) approximate date of introduction, (3) current geographic distribution, (4) ecological/reproductive behavior, and (5) basic habitat and growth. Seventeen species are ranked as F1, 115 as F2, and 305 as F3. *Amaranthus graecizans* and *Glinus lotoides* are the first recorded non-native vascular plants in Oklahoma. Eight counties have ten or more first reports of a non-native taxa. Thirty-four species are designated as Watch. The Fundamental Invasiveness Index provides great facility for evaluating a large number of non-native taxa.

The ecologic and economic impact of non-native invasive species has been the subject of intense study in recent decades and the literature on the subject is burgeoning (see Pysek & Richardson 2010; Lowry et al. 2013; Dueñas et al. 2018). The Convention on Biological Diversity included non-native invasive species in the Strategic Plan for Biodiversity as one of the 20 Aichi Targets. Target 9 states that “By 2020, invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated and measures are in place to manage pathways to prevent their introduction and establishment” (Leadley et al. 2014). Target 9 recognizes that not all non-native species that are established in a geographic locale are invasive. For example, the U.S. Fish and Wildlife Service (2019) estimates that of 50,000 non-native species that occur in the USA, only 4,300 (11.6%) are invasive. In this paper, I assess the invasive potential of non-native vascular plants known to occur in the state of Oklahoma using the Fundamental Invasiveness Index (FNI) developed by Nesom (2009).

A bewildering lexicon has evolved around the terms non-natives species and invasive. The definitions I use here are derived from Section 1 of Presidential Executive Order 13112 (1999). For example, my use of “non-native species” is synonymous with the term “alien species” as defined in the Executive Order: “Alien species means, with respect to a particular ecosystem, any species, including its seeds, eggs, spores, or other biological material capable of propagating that species, that is not native to that ecosystem.” The terms introduction (“the intentional or unintentional escape, release, dissemination, or placement of a species into an ecosystem as a result of human activity”) and invasive species (“an alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health”) follow the Executive Order.

METHODS

Government agencies and NGOs have developed and/or adopted frameworks for evaluating invasive potential to assist conservation biologists and land managers in recognizing which non-native species pose a current or potential threat as an invasive; the NatureServe (Morse 2004)

Invasive Species Impact Rank and the New York Non-Native Plant Assessment (2019) are two of many examples. The majority of these frameworks require access to extensive geographic and life history data that often is not complete or readily available. In many cases, the data required are lacking for some taxa. This presents a challenge for the assessment and ranking of non-native species in a state or regional flora. The Fundamental Invasiveness Index (Nesom 2009) is a readily accessible framework for the assessment of invasive potential of a large pool of non-native species in a flora. Each non-native taxon is evaluated based on five categories: (1) nativity, (2) approximate date of introduction, (3) current geographic distribution, (4) ecological/reproductive behavior, and (5) Basic habitat and growth (Nesom 2009). Each species or taxon is then evaluated and assigned to one of four categories (Nesom 2009):

F1: Invasive in both disturbed and natural habitats, negatively affecting native species or natural biodiversity by altering native vegetation and habitats or by outcompeting or hybridizing with native species, or, invasive into agricultural habitats and causing significant economic damage, including woody, herbaceous, and aquatic species.

F2: Abundant in number and widespread, commonly invasive in disturbed habitats, much less commonly in natural habitats, subdivided into woody, herbaceous, and aquatic species.

F3: Relatively few in number, known from relatively few localities, usually in disturbed habitats, subdivided into woody and herbaceous species.

F4: Status unknown

I initiated this project by generating a list of non-native vascular plants from the Oklahoma Vascular Plants Database (OVPD 2019). The OVPD contains >240,000 records, each representing a voucher deposited in one of eight in-state herbaria. The OVPD captures all information provided by the collector on the voucher label, which is parsed into Darwin Core (Wieczorek et al. 2012) fields. The OVPD also contains the annotation history of each voucher. Some taxa on the preliminary list are ornamental or other cultivated plants. These were discarded if the collector indicated that the voucher was planted or cultivated. If not indicated as such, the taxon was retained on the list.

Nativity was determined using Taylor and Taylor (1994) and USDA Plants (2019). Approximate date of introduction is defined as the specimen of a non-native species in the OVPD with the earliest collection date. It is recognized that the non-native species probably arrived in the state long before the first collection, but herbarium records are the closest approximation of arrival times available. For example, the Robert Bebb Herbarium at the University of Oklahoma (OKL) is the oldest herbarium in the state and was therefore the primary source for approximate date of introduction. Founded in 1893 by Professor Edwin DeBarr, at which time it housed 250 specimens from Oklahoma, OKL grew to 4,000 specimens by 6 January 1903. Sadly, OKL was destroyed by fire in that year and all specimens were lost (Rice & Cross 1990). Although the OVPD does contain records from 1894 to the present, the destruction of OKL in 1903 may result in the loss of vouchers with earlier approximate dates of introduction. Therefore, it seemed prudent to review floristic lists from Oklahoma that predated the fire, the most comprehensive of which are Holzinger (1892), Olive (1895), and Bogue (1900). Only the *Annotated catalogue of the ferns and flowering plants of Oklahoma* by Ernest Everett Bogue included non-native plant species. Bogue, a botanist and entomologist at the Oklahoma Agricultural Experiment Station (located in Guthrie, Oklahoma Territory), based his catalog upon specimens maintained at the Station. Professor Joseph W. Blankenship, who was a member of the faculty at Montana State College of Agriculture and Mechanical Arts, assisted Bogue with identifications and contributed information from his personal collections made in Oklahoma Territory (Bogue 1900). There are no records in the OVPD bearing either the name Bogue or Blankenship.

County distribution records in the OVPD were the basis for current geographic distribution. Ecological/reproductive behavior in Oklahoma and in other regions was based on published literature, information provided herbarium collection labels, and expert knowledge. Basic habitat and growth form (forb, graminoid, vine, or woody) information was determined using Taylor and Taylor (1994) and USDA Plants (2017). The taxonomy follows the ITIS (2019).

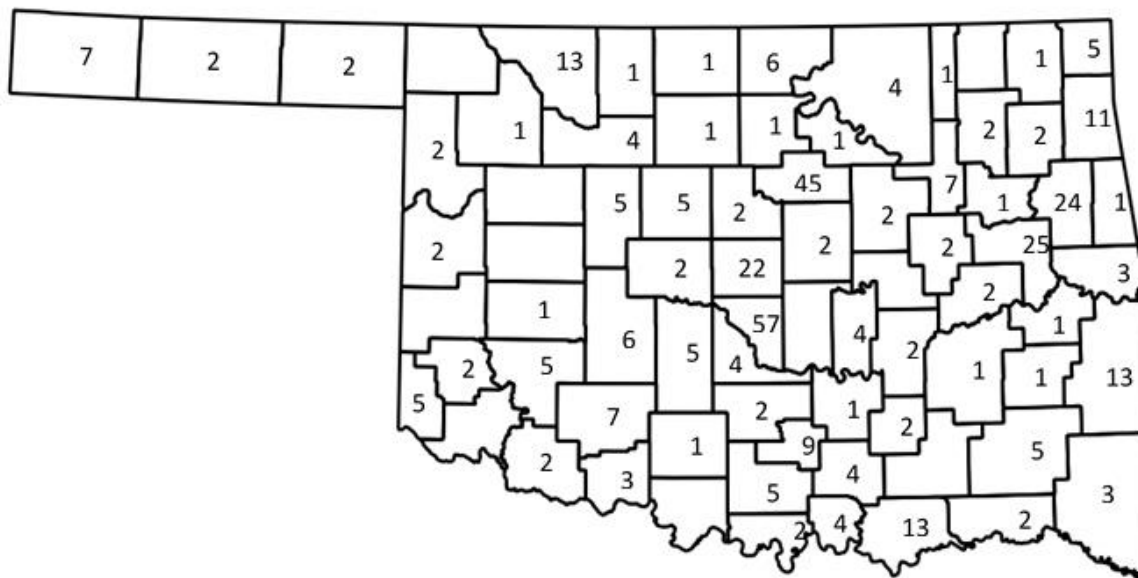


Figure 1. A count of approximate first date of introduction by county for non-native vascular plant taxa based upon records in the Oklahoma Vascular Plant Database (2019).

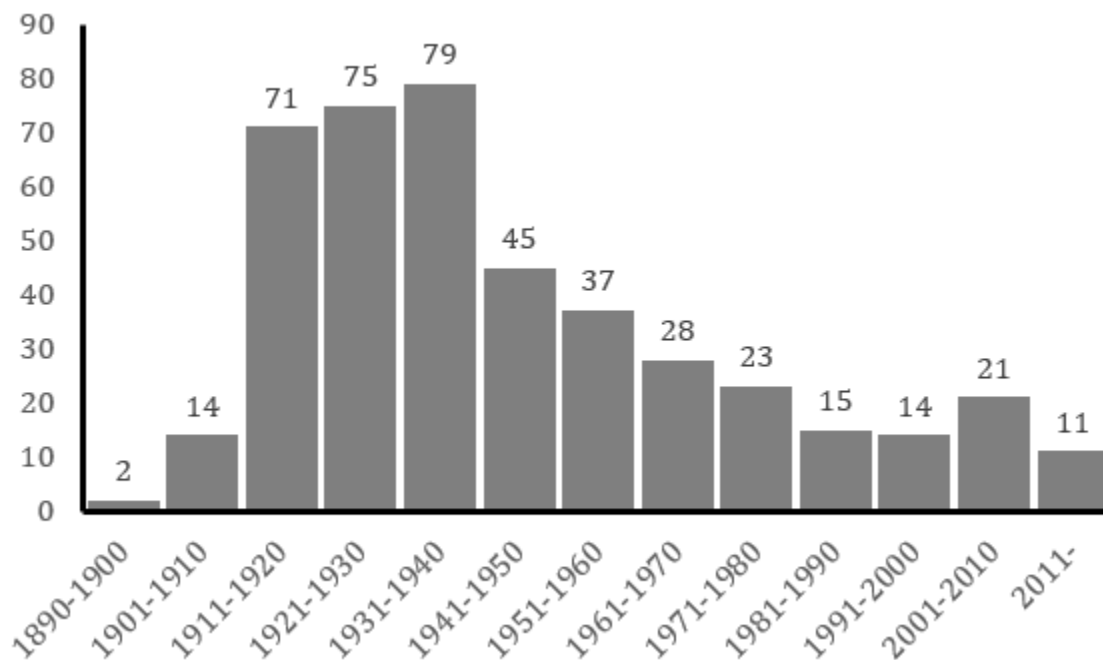


Figure 2. A count of approximate first date of introduction by year for non-native vascular plant taxa based upon records in the Oklahoma Vascular Plant Database (2019).

RESULTS AND DISCUSSION

A total of 436 species in 265 genera and 73 families were assessed and assigned a Fundamental Invasiveness Index score (Table 1). Four families have 30 or more non-native taxa: Asteraceae (n=37), Brassicaceae (n=32), Fabaceae (n=46), and Poaceae (n=86). The five genera containing the most species evaluated are *Bromus* (n=10), *Eragrostis* (n=8), *Medicago* (n=6), *Rumex* (n=6), *Trifolium* (n=11), and *Veronica* (n=6). In terms of life history, 216 are annuals, 35 biennials, 185 perennials, and among life history categories 305 (including two ferns) were forbs, 90 are graminoids, 40 trees or shrubs, and eight vines. The number of taxa in each Fundamental Invasiveness Index rank are F3 = 294, F2 = 119, F1 = 21.

Amaranthus graecizans and *Glinus lotoides* are the first vouchered non-native vascular plants in Oklahoma; both were collected in 1894. Neither, however, can be confidently attributed to a county of collection. Seven specimens dating from 1902-1930 also lacked a county of collection. This represents one of two challenges when working with older collections: (1) lack of geographic location and/or (2) no collection date recorded on the label. In regard to the former, location of the collection was either not provided on the label or was confounded by changes in the internal geography of the state. The specimen of *Glinus lotoides* was collected by Benjamin Franklin Bush of Missouri on 30 July 1894, which is prior to statehood (Oklahoma entered the Union in 1907). It was one of several vouchers labeled as “Plants of Indian Territory” at OKL and the Oklahoma State University herbarium (OKLA). The location is listed as “Verdigris,” which either refers to the settlement of Verdigris (present day Rogers County) or a location along the Verdigris River, which passes through several counties. Less problematic is the Bush specimen of *Amaranthus graecizans*, collected at a location reported as Sapulpa, Creek Nation, Indian Territory. At the time of the collection, Sapulpa was part of the Okmulgee District of the Creek Nation, but after statehood it became the county seat for Creek County.

First occurrences are reported from 67 of the 77 counties in Oklahoma (Figure 1). Eight counties have ten or more first reports of a non-native taxon: Cleveland (n=57), Payne (n=45), McCurtain (n=40), Muskogee (n=25), Cherokee (n=24), Oklahoma (n=22), Bryan (13), LeFlore (n=13), and Woods (n=13). The leading two counties are home to the University of Oklahoma and Oklahoma State University, respectively. Five species had the same year of approximate date of introduction but specimens reported from two counties: LeFlore and Pushmataha (*Cardamine hirsuta*, 1968), Kiowa and Tilman (*Glaucium flavum*, 1985), Cleveland and Murray (*Ipomoea purpurea*, 1919), Adair and Delaware (*Leucanthemum vulgare*, 1938), and Cleveland and Oklahoma (*Lythrum salicaria*, 1993). The most broadly distributed of the non-native species are *Capsella bursa-pastoris* and *Echinochloa crus-galli* (both ranked F2), reported from 72 of the 77 counties respectively.

The year 1913 has the most approximate dates of introduction (n=46) for non-native vascular plants, with subsequent peaks in 1927 and 1940 (15 records each; Figure 2). In the 123 years since the first documentation of a non-native vascular plants in Oklahoma, there have been only 23 years without a first occurrence record.

All records for 1913 were collected by George Walter Stevens (1868-1936), a faculty member at the State Normal School in Alva (now Northwestern Oklahoma State University) from 1904 to 1912 and director of the State Botanical Survey (which is defunct) in 1913 (Lawson et al. 1978). He and four assistants conducted five collecting expeditions, each to a different region of Oklahoma, from 6 April to 20 September 1913, resulting in some 4,600 specimens (Goodman et al. 1978). He later completed the first flora of Oklahoma (Stevens 1916).

As mentioned earlier, two vexing aspects of this research have been the lack of location information and/or collection date for a voucher. In the case of *Matricaria recutita*, only two vouchers exist; one lacks a collection date, the other location information. The only specimen of

Tanacetum vulgare, collected by Celeste Whaley in Delaware County, lacks a collection date. Many vouchers collected by Stevens, an important source of early 20th century botanical material for Oklahoma, often lack collection dates. Two examples are his collections of *Cyperus rotundus* and *Heliotropium indicum* from McCurtain County, which was not included in the itinerary of the 1913 expeditions. To ascertain the year of collection, I determined that collection numbers for Stevens work in McCurtain County range from 3745 and ends with 3888. A collection date accompanies only one of those specimens: *Asplenium platyneuron*, collection number 3857, 28 May 1916. *Cyperus rotundus* and *H. indicum* bear the collection numbers 3745 and 3752, so the approximate date of introduction for these two species is indicated as 1916. Otherwise, the approximate date of introduction for *C. rotundus* is 1941, based on the specimen collected by C. Smith and W. Randel from Pontotoc County, and 1919 for *H. indicum*, from a specimen by R.E. Jeffs from LeFlore (Appendix 1). Of course, this would change the first county of collection as well.

Based on the species list provided by Bogue (1900), there were 27 species for which the approximate date of introduction was earlier than the specimen in the OVPD (Appendix 2). Actual collection dates were not provided by Bogue. For example, the first collection in the OVPD of *Sorghum halepense* was by Stevens on 21 June 1913 from Harmon County. *Sorghum halepense* appears in Bogue's catalog for Oklahoma Territory with the note "introduced from Texas. Considered by many as a most troublesome weed and by others as a most valuable forage plant. It is very tenacious... ."

Bogue (1900) also reported *Anredera baselloides* as occurring in Oklahoma Territory, noting "Determined by J.W. Blankinship, this is the first record north of its appearance north of Mexico. Collected only once by F.M. Greiner at Stillwater. Have not been able to find plants since the first collection," nor has it been found since. Also included in his list is *Canavalia ensiformis* (L.) DC. "a volunteer in sandy soil along the Cimarron" River. There are no records of either plant in the OVPD.

Of the 436 taxa assessed, only 17 (4%) are ranked as F1. The majority of species are ranked as F3 (n= 305, 70%); F2 species account for 26% (n=115). Thirty-four species are designated as Watch (W): F3W=15, F2W=20. The watch list for Oklahoma Invasive Plants Council lists 29 species, of which 26 species are designated as Watch species here. It should be noted that the watch designation in this research is not intended to contradict or call in to question the OKIPC watch list.

CONCLUSIONS

Existing frameworks for evaluating and ranking the potential for invasive behavior by non-native species can be challenging when employed for a large number of taxa. In this research, the Fundamental Invasiveness Index provided great facility for evaluating numerous species of non-native taxa. Pairing the Fundamental Invasiveness score with a Watch designation, as recommended by Nesom (2009), provides an understanding of whether the taxa possesses a moderate or high level threat. Watch species in this research are F2 and F3 due to the limited number of geographic locations reported. For example, *Hydrilla verticillata* is ranked as F2W, primarily due to the low number of occurrences within the state. The same is true for *Onopordum acanthium* and *Murdannia keisak*, both ranked as F3. As with all ranking systems, the Fundamental Invasiveness score should be reevaluated for each species at regular intervals. If the number of populations reported increases, the Fundamental Invasiveness Index score could change. But to have timely and relevant data requires funds allocated by agencies for continued inventory.

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APPENDIX 1

Fundamental Invasiveness Index scores for alien vascular plants known to occur in Oklahoma. Each entry consists of the assigned Fundamental Invasiveness Index (F1-F3. Note that a “W” immediately following the F-rank indicates a Watch species [i.e., F1W]), life history (P=perennial, A=annual, B=biennial), growth habit (F=forb, G=graminoid, V=vines, W=woody), CO=number of counties from which the taxon is currently known to occur, the name of the county from which the taxon was first reported (in some cases, first report may have been from two counties in the same year. Unknown indicates that the collector did not provide the county of location), and the date of first collection. Symbols: † = species on the Oklahoma Invasive Plant Council Watch List (www.okinvasives.org/watch-list-1); * = designated as a noxious aquatic plant by the Oklahoma Department of Wildlife Conservation; # = designated as a noxious weed by the Oklahoma Department of Agriculture, Food, and Forestry. The taxonomy follows the ITIS (2017).

ACORACEAE

Acorus calamus L. - F1, P, F, CO=5, Cleveland, 1937

AMARANTHACEAE

Alternanthera caracasana Kunth - F3, P, F, CO=2, Cleveland, 1944

Alternanthera paronychioides A. St.-Hil. - F1, P, F, CO=1, Pushmataha, 2001

*†*Alternanthera philoxeroides* (Mart.) Griseb. - F2W, P, F, CO=3, Wagoner, 1996

Alternanthera pungens Kunth - F3, P, F, CO=1, Bryan, 1972

Amaranthus albus L. - F2, A, F, CO=33, Blaine, 1913

Amaranthus blitoides S. Watson - F3, A, F, CO=1, Woods, 1916

Amaranthus graecizans L. - F3, A, F, CO=31, Creek, 1894

Amaranthus retroflexus L. - F2, A, F, CO=37, Kingfisher, 1903

Amaranthus spinosus L. - F3, A, F, CO=35, Ottawa, 1913

Atriplex patula L. - F3, P, W, CO=4, Oklahoma, 1939

Chenopodium album L. - F2, A, F, CO=54, Blaine, 1913

Chenopodium glaucum L. - F3, A, F, CO=5, Harmon, 1926

Chenopodium murale L. - F3, A, F, CO=1, Canadian, 2006

Dysphania ambrosioides (L.) Mosyakin & Clemants - F2, A, F, CO=32, Major, 1913

Dysphania pumilio (R. Br.) Mosyakin & Clemants - F3, A, F, CO=11, McCurtain, 1930

Kochia scoparia ssp. *scoparia* (L.) Schrad. - F2, A, F, CO=25, Woods, 1913

Salsola collina Pall. - F3, A, F, CO=1, Cimarron, 1988

Salsola tragus L. - F1, A, F, CO=31, Harmon, 1913

AMARYLLIDACEAE

Allium ampeloprasum L. - F3, P, F, CO=2, Comanche, 1942

Allium sativum L. - F3, P, F, CO=10, Osage, 1959

Allium vineale L. - F3, P, F, CO=11, Payne, 1941

Narcissus jonquilla L. - F3, P, F, CO=3, McCurtain, 1978

Narcissus pseudonarcissus L. - F3, P, F, CO=1, Muskogee, 1993

APIACEAE

Anethum graveolens L. - F3, A, F, CO=6, Kingfisher, 1935

Anthriscus caucalis M. Bieb. - F3, A, F, CO=3, Canadian, 1964

Conium maculatum L. - F2, B, F, CO=15, Payne, 1934

Coriandrum sativum L. - F3, A, F, CO=2, Oklahoma, 1930

Cyclosporum leptophyllum (Pers.) Sprague ex Britton & P. Wilson - F3, A, F, CO=4, McCurtain, 1984

Daucus carota L. - F2, B, F, CO=24, Bryan, 1919

Falcaria vulgaris Bernh. - F3, P, F, CO=2, Major, 1957

Pastinaca sativa L. - F3, B, F, CO=2, Cleveland, 1924

Torilis arvensis (Huds.) Link - F2, A, F, CO=51, Muskogee, 1927

Torilis nodosa (L.) Gaertn. - F3, A, F, CO=15, Bryan, 1963

APOCYNACEAE

Catharanthus roseus (L.) G. Don - F3, A, F, CO=2, Payne, 1934

Vinca major L. - F3, P, F, CO=7, Payne, 1939

Vinca minor L. - F3, P, F, CO=3, Bryan, 1969

ARALIACEAE

Hedera helix L. F3, P, V, CO=2, Pontotoc, 1989

ASPARAGACEAE

Asparagus officinalis L. - F3, P, F, CO=18, Pottawatomie, 1923

Muscari botryoides (L.) P. Mill. - F3, P, F, CO=4, Oklahoma, 1926

ASTERACEAE

Anthemis cotula L. - F2, A, F, CO=24, LeFlore, 1914

Arctium minus Bernh. - F2, B, F, CO=17, Cherokee, 1925

Artemisia annua L. - F3, A, F, CO=7, Murray, 1936

Carduus nutans L. - F1, B, F, CO=32, Payne, 1946

Carthamus lanatus L. - F3, A, F, CO=2, McClain, 1985

Centaurea cyanus L. - F2, A, F, CO=22, Cleveland, 1928

Centaurea solstitialis L. - F3, A, F, CO=2, Creek, 1947

Cichorium intybus L. - F2, P, F, CO=11, Murray, 1945

#*Cirsium vulgare* (Savi) Ten. - F2, B, F, CO=15, Cherokee, 1951

Cosmos sulphureus Cav. - F3, A, F, CO=2, McClain, 1960

Crepis pulchra L. - F3, A, F, CO=10, Latimer, 1958

Facelis retusa (Lam.) Sch. Bip. - F3, A, F, CO=11, McCurtain, 1957

Galinsoga parviflora Cav. - F3, A, F, CO=2, Cimarron, 1967

Galinsoga quadriradiata Cav. - F3, A, F, CO=2, Cherokee, 1924

Lactuca saligna L. - F3, B, F, CO=7, Oklahoma, 1972

Lactuca sativa L. - F3, B, F, CO=3, Comanche, 1938

Lactuca serriola L. - F2, B, F, CO=51, Woods, 1913

Leucanthemum vulgare Lam. - F2, P, F, CO=20, Adair and Delaware, 1938

Matricaria discoidea DC. - F3, A, F, CO=8, Cleveland, 1930

Matricaria chamomilla L. - F3, A, F, CO=1, Pittsburg, no date available

#*Onopordum acanthium* L. - F3W, B, F, CO=1, Roger Mills, 1976

Parthenium hysterophorus L. - F2, A, F, CO=21, Garvin, 1926

Rhaponticum repens (L.) Hidalgo - F3, P, F, CO=2, Roger Mills, 1947

Scorzonera laciniata L. - F3, P, F, CO=1, Cimarron, 2014

Senecio vulgaris L. - F3, A, F, CO=6, Oklahoma, 1997

Silybum marianum (L.) Gaertn. - F3, B, F, CO=1, Blaine, 1986

Soliva sessilis Ruiz & Pav. - F3, A, F, CO=6, Marshall, 1969

Sonchus asper (L.) Hill - F2, A, F, CO=58, Cleveland, 1916

Sonchus oleraceus L. - F3, A, F, CO=7, Payne, 1912

Tagetes erecta L. - F3, A, F, CO=3, Payne, 1972

Tanacetum vulgare L. - F3, P, F, CO=1, Delaware, date unavailable
Taraxacum erythrospermum Andr. ex Besser - F2, P, F, CO=23, Payne, 1935
Taraxacum officinale F.H. Wigg. - F23, P, F, CO=60, Cleveland, 1913
Tragopogon dubius Scop. - F2, B, F, CO=60, Oklahoma, 1939
Tragopogon porrifolius L. - F3, B, F, CO=11, Oklahoma, 1920
Tragopogon pratensis L. - F3, B, F, CO=14, Cleveland, 1926
Xanthium spinosum L. - F3, A, F, CO=3, Marshall, 1950

BORAGINACEAE

Buglossoides arvensis (L.) I.M. Johnston - F2, A, F, CO=43, Kingfisher, 1938
Cynoglossum amabile Stapf & J.R. Drumm. - F3, B, F, CO=4, McCurtain, 1930
Myosotis stricta Link ex Roem. & Schult. - F3, A, F, CO=3, Tulsa, 1957

BRASSICACEAE

†*Alliaria petiolata* (M. Bieb.) Cavara & Grande - F3W, B, F, CO=1, Delaware, 1994
Alyssum alyssoides (L.) L. - F3, A, F, CO=3, Cleveland, 1927
Arabidopsis thaliana (L.) Heynh. - F3, A, F, CO=1, McCurtain, 1941
Barbarea vulgaris W.T. Aiton - F3, B, F, CO=11, Cleveland, 1926
Brassica juncea (L.) Czern. - F3, A, F, CO=8, Cleveland, 1922
Brassica napus L. - F3, A, F, CO=5, Payne, 1940
Brassica nigra (L.) W.D.J. Koch - F3, A, F, CO=19, Cleveland, 1927
Brassica rapa L. - F3, A, F, CO=16, Cleveland, 1924
Camelina microcarpa DC. - F2, A, F, CO=42, Oklahoma, 1925
Camelina rumelica Velen. - F3, A, F, CO=14, Kingfisher, 1937
Camelina sativa (L.) Crantz - F3, A, F, CO=2, Muskogee, 1940
Capsella bursa-pastoris (L.) Medik. - F2, A, F, CO=72, Unknown, 1902
Cardamine hirsuta L. - F3, A, F, CO=27, LeFlore and Pushmataha, 1968
Cardaria draba (L.) Desv. - F3, P, F, CO=6, Payne, 1937
Chorispora tenella (Pallas) DC. - F2, A, F, CO=18, Oklahoma, 1925
Conringia orientalis (L.) Dumort. - F3, A, F, CO=10, Cleveland, 1919
Descurainia sophia (L.) Webb ex Prantl - F3, A, F, CO=29, McClain, 1937
Eruca vesicaria (L.) Cav. - F3, A, F, CO=2, Oklahoma, 1974
Erysimum repandum L. - F2, A, F, CO=44, Cleveland, 1926
Lepidium apetalum Willd. - F3, B, F, CO=3, Beaver, 1913
Lepidium campestre (L.) W.T. Aiton - F3, B, F, CO=4, Sequoyah, 1955
Lepidium densiflorum Schrad. - F3, B, F, CO=67, Unknown, 1906
Lepidium perfoliatum L. - F3, B, F, CO=3, Payne, 1937
Lepidium ruderales L. - F3, B, F, CO=1, Payne, 1934
Myagrimum perfoliatum L. - F3, A, F, CO=1, Tillman, 2012
Microthlaspi perfoliatum (L.) F.K. Mey. - F3, A, F, CO=1, Kay, 1973
Nasturtium officinale W.T. Aiton - F2, P, F, CO=35, Ellis, 1913
Sinapis arvensis L. - F3, A, F, CO=16, Murray, 1934
Sisymbrium altissimum L. - F3, A, F, CO=20, Cleveland, 1919
Sisymbrium irio L. - F3, A, F, CO=1, Cleveland, 1928
Sisymbrium officinale (L.) Scop. - F3, A, F, CO=18, Cherokee, 1926
Thlaspi arvense L. - F3, A, F, CO=20, Cleveland, 1919

CANNABACEAE

Cannabis sativa L. - F3, A, F, CO=13, Lincoln, 1909
Humulus japonicus Siebold & Zucc. - F3, A, V, CO=3, Rogers and Tulsa, 2010
Humulus lupulus L. - F3, P, V, CO=9, Ottawa, 1955

CAPRIFOLIACEAE

- Lonicera japonica* Thunb. - F1, P, V, CO=46, Payne, 1936
 †*Lonicera maackii* (Rupr.) Herder - F3W, P, V, CO=7, Woodward, 1980

CARYOPHYLLACEAE

- Agrostemma githago* L. - F3, A, F, CO=12, Lincoln, 1938
Arenaria serpyllifolia L. - F2, A, F, CO=52, Muskogee, 1927
Cerastium brachypetalum Pers. - F3, A, F, CO=7, Cherokee, 1952
Cerastium brachypodum (Engelm. ex A. Gray) B.L. Rob. - F2, P, F, CO=43, Mayes, 1905
Cerastium fontanum Baumg. - F2, B, F, CO=24, Cleveland, 1923
Cerastium glomeratum Thuill. - F2, A, F, CO=41, Muskogee, 1927
Cerastium pumilum W. Curtis - F3, A, F, CO=19, Muskogee, 1958
Dianthus armeria L. - F2, B, F, CO=28, Delaware, 1938
Gypsophila paniculata L. - F3, P, F, CO=2, Cleveland, 1928
Holosteum umbellatum L. - F2, A, F, CO=22, Cleveland, 1953
Petrorhagia prolifera (L.) P.W. Ball & Heywood - F3, A, F, CO=6, Cherokee, 1951
Saponaria officinalis L. - F3, P, F, CO=17, Cleveland, 1922
Scleranthus annuus L. - F3, A, F, CO=7, Marshall, 1973
Silene noctiflora L. - F3, A, F, CO=2, McCurtain, 1930
Stellaria media (L.) Vill. - F2, A, F, CO=58, Cleveland, 1915
Vaccaria hispanica (Mill.) Rauschert - F3, A, F, CO=5, Pontotoc, 1941

CELASTRACEAE

- Euonymus alatus* (Thunb.) Siebold - F3, P, W, CO=1, Tulsa, 1989
Euonymus bungeanus Maxim. - F3, P, W, CO=2, Kingfisher, 2013
Euonymus fortunei (Turcz.) Hand.-Maz. - F3, P, W, CO=2, Bryan, 1987
Euonymus japonicus Thunb. - F3, P, W, CO=3, Woods, 1975
Euonymus kiautschovicus Loes - F3, P, W, CO=1, Tulsa, 2010

CLEOMACEAE

- Gynandropsis gynandra* (L.) Briq. - F3, A, F, CO=2, Muskogee, 1939
Tarenaya hassleriana (Chodat) Iltis - F3, A, F, CO=6, LeFlore, 1913

COMMELINACEAE

- Commelina communis* L. - F2, A, F, CO=35, Muskogee, 1926
Murdannia keisak (Hassk.) Hand.-Maz. - F3W, P, F, CO = 1, McCurtain, 2013

CONVOLVULACEAE

- †*Convolvulus arvensis* L. - F2W, P, F, CO=61, Woods, 1913
Ipomoea coccinea L. - F3, A, F, CO=13, Payne, 1915
Ipomoea hederacea Jacq. - F2, A, F, CO=33, Logan, 1905
Ipomoea purpurea (L.) Roth - F3, A, F, CO=25, Cleveland and Murray, 1919
Ipomoea quamoclit L. - F3, A, F, CO=5, Pushmataha, 1932
Ipomoea wrightii Gray - F3, P, F, CO=1, McCurtain, 1950

CUCURBITACEAE

- Citrullus lanatus* (Thunb.) Matsum. & Nakai var. *lanatus* - F3, A, F, CO=5, Muskogee, 1928
Cucumis melo L. - F3, A, F, CO=3, Cleveland, 1926
Lagenaria siceraria (Molina) Standl. - F3, A, F, CO=1, Cherokee, 1950

CYPERACEAE

- Cyperus difformis* L. - F1, A, G, CO=1, Payne, 2012
Cyperus esculentus L. - F2W, P, G, CO=42, Woods, 1913
Cyperus iria - F3, A, G, CO=6, McCurtain, 1962
†*Cyperus rotundus* L. - F2W, P, G, CO=16, McCurtain, 1916

DIOSCOREACEAE

- Dioscorea oppositifolia* L. - F3, P, F, CO=3, Cherokee, 1960

DIPSACACEAE

- †*Dipsacus fullonum* L. - F2W, B, F, CO=5, Delaware, 1956
Scabiosa atropurpurea L. - F3, P, F, CO=1, Bryan, 2015

ELAEAGNACEAE

- Elaeagnus angustifolia* L. - F2W, P, W, CO=17, Cleveland, 1934
†*Elaeagnus pungens* Thunb. - F3W, P, W, CO=4, Oklahoma, 1931
†*Elaeagnus umbellata* Thunb. - F3W, P, W, CO=5, Comanche, 1989

EUPHORBIACEAE

- Ricinus communis* L. - F3, A, F, CO=6, Unknown, 1930
Triadica sebifera (L.) Small - F2W, P, T, CO=1, McCurtain, 2019

FABACEAE

- †*Albizia julibrissin* Durazz. - F2W, P, W, CO=28, Payne, 1946
†*Alhagi maurorum* Medik. - F3, P, W, CO=11, Cotton, 1947
Astragalus chinensis L. f. - F3, P, F, CO=1, Payne, 1940
Arachis hypogaea L. - F3, P, F, CO=2, Caddo, 1944
Erythrostemon gilliesii (Wall. ex Hook.) Klotzsch - F3, P, W, CO=11, Payne, 1941
Colutea arborescens L. - F3, P, W, CO=2, Payne, 1939
Galega officinalis L. - F3, P, F, CO=1, Comanche, 1937
Halimodendron halodendron (L.f.) Voss - F3, P, W, CO=1, Ellis, 1964
Kummerowia stipulacea (Maxim.) Makino - F3, A, F, CO=35, Payne, 1937
Kummerowia striata (Thunb.) Schindl. - F3, A, F, CO=20, Payne, 1937
Lathyrus hirsutus L. - F3, A, F, CO=20, Delaware, 1940
Lathyrus latifolius L. - F3, P, F, CO=11, Pushmataha, 1932
Lathyrus sativus L. - F3, A, F, CO=1, Tulsa, 2003
Lespedeza bicolor Turcz. - F3, P, F, CO=2, Coal, 1989
Lespedeza cuneata (Dum. Cours.) G. Don - F1, P, F, CO=36, Johnston, 1961
Lespedeza thunbergii (DC.) Nakai - F3, P, F, CO=2, Ottawa, 2004
Lotus corniculatus L. - F3, P, F, CO=3, Cleveland, 2003
Medicago arabica (L.) Huds. - F3, A, F, CO=10, Cleveland, 1914
Medicago lupulina L. - F2, P, F, CO=35, Oklahoma, 1925
Medicago minima (L.) L. - F2, A, F, CO=34, Murray, 1929
Medicago orbicularis (L.) Bartal. - F3, A, F, CO=11, Murray, 1948
Medicago polymorpha L. - F3, P, F, CO=8, McCurtain, 1938
Medicago sativa L. - F2, P, F, CO=43, Cleveland, 1919
Melilotus albus Medik. - F2, B, F, CO=23, Woods, 1913
Melilotus indicus (L.) All. - F3, A, F, CO=1, Noble, 1939
Melilotus officinalis (L.) Lam. - F2, A, F, CO=60, Cleveland, 1919
Pisum sativum L. - F3, A, F, CO=6, LeFlore, 1944
†*Pueraria montana* (Lour.) Merr. - F2W, P, V, CO=15, Payne, 1941

Securigera varia (L.) Lassen - F3, P, F, CO=17, Payne, 1938
Senna occidentalis (L.) Link - F3, P, F, CO=7, LeFlore, 1913
Trifolium arvense L. - F2, A, F, CO=24, Haskell, 1948
Trifolium campestre Schreb. - F2, B, F, CO=44, Cleveland, 1926
Trifolium dubium Sibth. - F2, A, F, CO=29, Cleveland, 1927
Trifolium hybridum L. - F3, A, F, CO=9, Cleveland, 1927
Trifolium incarnatum L. - F2, A, F, CO=29, Kay, 1935
Trifolium pratense L. - F3, P, F, CO=26, Caddo, 1913
Trifolium repens L. - F2, P, F, CO=34, Caddo, 1913
Trifolium resupinatum L. - F3, A, F, CO=11, McCurtain, 1950
Trifolium striatum L. - F3, A, F, CO=1, Choctaw, 1939
Trifolium subterraneum L. - F3, A, F, CO=1, LeFlore, 1937
Trifolium vesiculosum Savi - F3, A, F, CO=20, Johnston, 1973
Vicia cracca L. - F3, P, F, CO=5, Muskogee, 1909
Vicia sativa L. - F2, A, F, CO=36, McClain, 1930
Vicia tetrasperma (L.) Schreb. - F3, A, F, CO=1, Murray, 1942
Vicia villosa Roth - F2, B, F, CO=35, Cleveland, 1903
Wisteria floribunda (Willd.) DC. - F3, P, V, CO=1, McCurtain, 2010

GERANIACEAE

Erodium cicutarium (L.) L'Hér. ex Aiton - F2, A, F, CO=40, Oklahoma, 1923
Geranium dissectum L. - F3, A, F, CO=10, Bryan, 1997
Geranium molle L. - F3, B, F, CO=7, Cherokee, 1947
Geranium pusillum L. - F3, B, F, CO=24, Cherokee, 1955

HELIOTROPIACEAE

Heliotropium indicum L. - F2, A, F, CO=30, McCurtain, 1916

HALORAGACEAE

Myriophyllum aquaticum (Vell.) Verdc. - F2W, P, F, CO=14, Carter, 1936
Myriophyllum spicatum L. - F2W, P, F, CO=10, Comanche, 1959

HYDROCHARITACEAE

Egeria densa Planch. - F3W, P, F, CO=7, Payne, 1940
 **Hydrilla verticillata* (L. f.) Royle - F2W, P, F, CO=3, Murray, 2006

HYDRANGEACEAE

Philadelphus inodorus L. - F3, P, W, CO=4, Payne, 1933

HYPERICACEAE

Hypericum perforatum L. - F2, P, W, CO=25, Muskogee, 1951

IRIDACEAE

Iris domestica (L.) Goldblatt & Mabb. - F3, P, F, CO=5, McCurtain, 1930
Iris germanica L. - F3, P, F, CO=2, Comanche, 1995
Iris pseudacorus L. - F3, P, F, CO=2, McCurtain, 2002

JUNCACEAE

Juncus capitatus Weigel - F3, P, G, CO=3, McCurtain, 1980

LAMIACEAE

- Ajuga reptans* L. - F3, P, F, CO=2, Bryan, 1973
Galeopsis tetrahit L. - F3, A, F, CO=1, LeFlore, 1969
Glechoma hederacea L. - F3, P, F, CO=14, Payne, 1936
Lamium amplexicaule L. - F2, B, F, CO=67, Cleveland, 1916
Lamium purpureum L. - F2, A, F, CO=40, Cherokee, 1925
Leonurus cardiaca L. - F3, P, F, CO=3, Cherokee, 1925
Leonurus sibiricus L. - F3, P, F, CO=3, Cherokee, 1956
Marrubium vulgare L. - F2, P, F, CO=25, Pawnee, 1905
Melissa officinalis L. - F3, P, F, CO=4, Mayes, 1955
Mentha × *gracilis* Sole (pro sp.) [*arvensis* × *spicata*] - F3, P, F, CO=2, Washington, 1972
Mentha arvensis L. - F3, P, F, CO=2, Oklahoma, 1940
Mentha spicata L. - F2, P, F, CO=11, Cotton, 1934
Mentha × *piperita* (pro sp.) - F2, P, F, CO=12, Cleveland, 1924
Nepeta cataria L. - F3, P, F, CO=10, Cherokee, 1924
†*Perilla frutescens* (L.) Britton - F2, A, F, CO=20, Muskogee, 1927
Vitex agnus-castus L. - F3, P, F, CO=8, Pawnee, 1935

LILIACEAE

- Ornithogalum umbellatum* L. - F3, P, F, CO=12, Kay, 1945

LINACEAE

- Linum usitatissimum* L. - F3, A, F, CO=6, Carter, 1913

LYGODIACEAE

- †*Lygodium japonicum* (Thunb.) Sw. - F3, P, F, CO=1, McCurtain, 1980

LYTHRACEAE

- Lagerstroemia indica* L. - F3, P, W, CO=6, LeFlore, 1988
*†*Lythrum salicaria* L. - F3, P, F, CO=4, Cleveland and Oklahoma, 1993

MALVACEAE

- Abutilon theophrasti* Medik. - F2, A, F, CO=30, Osage, 1913
Alcea rosea L. - F3, P, F, CO=3, Pottawatomie, 1934
Hibiscus trionum L. - F3, A, F, CO=20, Stephens, 1905
Malva neglecta Wallr. - F2, P, F, CO=19, Oklahoma, 1925
Sida abutifolia Mill. - F3, P, F, CO=11, Murray, 1940

MARSILIACEAE

- **Marsilea mutica* Mett. - F3W, P, F, CO=1, Hughes, 2001

MELIACEAE

- †*Melia azedarach* L. - F2W, P, W, CO=8, McCurtain, 1944

MENYANTHACEAE

- Nymphoides peltata* (S.G. Gmel.) Kuntze - F3, P, F, CO=2, Bryan, 1947

MOLLUGINACEAE

- Glinus lotoides* L. - F3, A, F, CO=15, Unknown, 1894

MORACEAE

- †*Broussonetia papyrifera* (L.) L'Hér. ex Vent. - F3W, P, W, CO=11, Tulsa, 1931
Fatoua villosa (Thunb.) Nakai - F3, A, F, CO=10, Grady, 1985
Morus alba L. - F2, P, W, CO=51, Cleveland, 1926

NYCTAGINACEAE

- Mirabilis jalapa* L. - F3, P, F, CO=6, Cherokee, 1952

OLEACEAE

- Jasminum nudiflorum* Lindl. - F3, P, W, CO=2, Bryan, 1993
Ligustrum quihoui Carr. - F3, P, W, CO=3, Oklahoma, 1959
Ligustrum sinense Lour. - F1, P, W, CO=22, Muskogee, 1940
Ligustrum vulgare L. - F2W, P, W, CO=7, Bryan, 1972

ONAGRACEAE

- Ludwigia grandiflora* (Michx.) Greuter & Burdet - F3, P, F, CO=6, Payne, 1946

PAPAVERACEAE

- †*Glaucium corniculatum* (L.) J.H. Rudolph - F3, A, F, CO=3, Payne, 1993
Glaucium flavum Crantz - F3, B, F, CO=2, Kiowa and Tillman, 1985
Papaver dubium L. - F3, A, F, CO=6, Muskogee, 1939

PAULOWNIACEAE

- †*Paulownia tomentosa* (Thunb.) Siebold & Zucc. ex Steud. - F3, P, W, CO=2, Comanche, 1946

PHYLLANTHACEAE

- Phyllanthus urinaria* L. - F3, A, F, CO=1, Grady, 1999

PLANTAGINACEAE

- Plantago lanceolata* L. - F2, P, F, CO=25, Cleveland, 1907
Plantago major L. - F2, P, F, CO=29, Oklahoma, 1931

POACEAE

- Aegilops cylindrica* Host - F2, A, G, CO=50, Payne, 1938
Agrostis gigantea Roth - F3, P, G, CO=11, Caddo, 1913
Agrostis stolonifera L. - F3, P, G, CO=7, Caddo, 1913
Aira caryophyllea L. - F2, A, G, CO=26, Muskogee, 1939
Aira elegantissima Schur - F3, A, G, CO=19, McCurtain, 1949
Anthoxanthum aristatum Boiss. - F3, A, G, CO=2, McIntosh, 2009
Anthoxanthum odoratum L. - F3, A, G, CO=4, Choctaw, 2001
Arthraxon hispidus (Thunb.) Makino - F3, P, G, CO=4, Cherokee, 1953
†*Arundo donax* L. - F2W, P, G, CO=10, Garfield, 1967
Avena fatua L. - F2, A, G, CO=23, Muskogee, 1927
†*Bothriochloa bladhii* (Retz.) S.T. Blake - F3W, P, G, CO=3, Woods, 1969
Bothriochloa ischaemum (L.) Keng - F1, P, G, CO=39, Payne, 1940
Briza minor L. - F3, A, G, CO=8, McCurtain, 1973
Bromus arvensis L. - F1, A, G, CO=65, Cleveland, 1923
Bromus commutatus Schrad. - F3, A, G, CO=32, Muskogee, 1927
Bromus catharticus Vahl - F2, P, G, CO=63, Love, 1913
Bromus diandrus Roth - F3, A, G, CO=3, Payne, 1940
Bromus hordeaceus L. - F2, A, G, CO=21, Muskogee, 1955

Bromus inermis Leyss. - F3, P, G, CO=9, Payne, 1924
Bromus racemosus L. - F3, A, G, CO=5, Cleveland, 1923
Bromus secalinus L. - F2, A, G, CO=35, Unknown, 1905
Bromus sterilis L. - F3, A, G, CO=5, Rogers, 1957
Bromus tectorum L. - F1, A, G, CO=66, Oklahoma, 1925
Chloris gayana Kunth - F3, P, G, CO=2, Payne, 1962
Cynodon dactylon (L.) Pers. - F1, P, G, CO=45, Oklahoma, 1924
Cynosurus echinatus L. - F3, A, G, CO=5, Carter, 1947
Dactylis glomerata L. - F2, P, G, CO=17, Payne, 1922
Catapodium rigidum (L.) Dony - F3, A, G, CO=1, Murray, 2012
Digitaria ciliaris (Retz.) Koeler - F2, A, G, CO=29, Ottawa, 1913
Digitaria ischaemum (Schreb.) Muhl. - F2, A, G, CO= 21, Muskogee, 1927
Digitaria sanguinalis (L.) Scop. - F2, A, G, CO=69, Washita, 1913
Digitaria violascens Link - F3, P, G, CO=5, McCurtain, 1950
Echinochloa colona (L.) Link - F3, A, G, CO=17, LeFlore, 1938
Echinochloa crus-galli (L.) Beauv. - F2, A, G, CO=72, Blaine, 1913
Echinochloa crus-pavonis (Kunth) J.A. Schultes - F3, A, G, CO=3, Cotton, 1940
Echinochloa muricata (Beauv.) Fern. - F3, A, G, CO=31, Blaine, 1913
Eleusine indica (L.) Gaertn. - F2, A, G, CO=48, Major, 1913
Elymus repens (L.) Gould - F3, P, G, CO=1, Greer, 1931
Eragrostis barrelieri Daveau - F2, A, G, CO=35, Grady, 1938
Eragrostis cilianensis (All.) Vign. ex Janchen - F2, A, G, CO=57, Harmon, 1913
Eragrostis curvula (Schrad.) Nees - F2W, P, G, CO=28, Payne, 1941
Eragrostis japonica (Thunb.) Trin. - F3, A, G, CO=6, Coal, 1949
Eragrostis lehmanniana Nees - F3, P, G, CO=3, Payne, 1940
Eragrostis minor Host - F3, A, G, CO=3, Pontotoc, 1952
Eragrostis pilosa (L.) P. Beauv. - F3, A, G, CO= 36, Logan, 1914
Eragrostis superba Peyr. - F3, P, G, CO=1, Woods, 1992
Glyceria declinata Bréb. - F3, P, G, CO=1, Love, 2018
Holcus lanatus L. - F3, P, G, CO=3, Delaware, 1962
Hordeum murinum L. - F3, A, G, CO=2, Cleveland, 1938
Hordeum vulgare L. - F3, A, G, CO=10, Payne, 1940
Lolium perenne L. - F2W, P, G, CO=41, Cleveland, 1923
Lolium temulentum L. - F3, A, G, CO=4, Payne, 1917
†*Microstegium vimineum* (Trin.) A. Camus - F2W, A, G, CO=3, Cherokee, 2004
Oryza sativa L. - F3, A, G, CO=1, McCurtain, 1974
Panicum antidotale Retz. - F3, P, G, CO=1, Kiowa, 1964
Panicum miliaceum L. - F3, A, G, CO=2, McCurtain, 1930
Paspalum dilatatum Poir. - F2, P, G, CO=41, Harmon, 1913
Paspalum notatum Alain ex Flügge - F2, P, G, CO=7, Pushmataha, 1968
Paspalum urvillei Steud. - F3, P, G, CO=5, McCurtain, 1936
Pennisetum glaucum (L.) R. Br. - F2, P, G, CO=48, Kay, 1913
Phalaris canariensis L. - F3, A, G, CO=6, Payne, 1922
Phleum pratense L. - F3, P, G, CO=2, Johnston, 1986
Poa annua L. - F2, A, G, CO=69, Carter, 1913
Poa bulbosa L. - F3, P, G, CO=8, Pontotoc, 1947
Poa compressa L. - F3, P, G, CO=10, Caddo, 1913
Poa pratensis L. - F2, P, G, CO=37, Garvin, 1913
Polypogon monspeliensis (L.) Desf. - F2, A, G, CO=34, Cleveland, 1922
Polypogon viridis (Gouan) Breistr. - F1, P, G, CO=2, Cimarron, 1947
†*Saccharum ravennae* (L.) L. - F2W, P, G, CO=17, McCurtain, 1930

Schedonorus phoenix (Scop.) Holub - F1, P, G, CO=30, Bryan, 1963
Schedonorus pratensis (Huds.) P. Beauv. - F3, P, G, CO=3, Osage, 2005
Sclerochloa dura (L.) Beauv. - F3, A, G, CO=9, Cleveland, 1973
Secale cereale L. - F3, A, G, CO=10, Marshall, 1957
Setaria faberi Herrm. - F3, A, G, CO=1, Craig, 1999
Setaria italica (L.) Beauv. - F3, A, G, CO=13, Woods, 1913
Setaria pumila (Poir.) Roem. & Schult. - F2, A, G, CO=18, Grady, 1972
Setaria verticillata (L.) P. Beauv. - F3, A, G, CO=2, Muskogee, 1939
Setaria viridis (L.) Beauv. - F2, A, G, CO=55, Woods, 1913
Sorghum bicolor (L.) Moench - F3, A, G, CO=9, Muskogee, 1927
Sorghum halepense (L.) Pers. - F1, P, G, CO=64, Harmon, 1913
Stenotaphrum secundatum (Walter) Kuntze - F3, P, G, CO=2, Carter, 1944
Thinopyrum elongatum (Host) D.R. Dewey - F3, P, G, CO=3, Payne, 1941
Thinopyrum ponticum (Podp.) Barkworth & D.R. Dewey - F3, P, G, CO=2, Grant, 1999
Tripidium ravennae (L.) H. Scholz - F1, P, G, CO= 17, McCurtain, 1930
Triticum aestivum L. - F3, A, G, CO=19, Muskogee, 1927
Vulpia myuros (L.) C.C. Gmel. - F3, A, G, CO=12, Adair, 1950

POLYGONACEAE

Fagopyrum esculentum Moench - F3, A, F, CO=1, Cherokee, 2004
Fallopia convolvulus (L.) Á. Löve - F2, A, F, CO=27, Woods, 1913
Fallopia japonica (Houtt.) Ronse Decr. var. *japonica* - F3, P, F, CO=2, Cleveland, 1936
Polygonum aviculare L. - F2, P, F, CO=54, Major, 1913
Polygonum aviculare ssp. *buxiforme* (Small) Costea & Tardif - F2, P, F, CO=3, Cherokee, 1957
Persicaria hydropiper (L.) Opiz - F3, A, F, CO=24, Kay, 1913
Persicaria longiseta (Bruijn) Kitag - F3, A, F, CO=5, McCurtain, 1994
Persicaria orientalis (L.) Spach - F3, A, F, CO=3, Pushmataha, 1932
Persicaria maculosa Gray - F2, A, F, CO=46, Kiowa (Swanson), 1913
Persicaria posumbu (Buch.-Ham. ex D. Don) H. Gross - F3, A, F, CO=1, Okmulgee, 2013
Rumex acetosella L. - F3, P, F, CO=19, Alfalfa, 1919
Rumex conglomeratus Murr. - F3, P, F, CO=1, McCurtain, 1956
Rumex crispus L. - F2, P, F, CO=65, Cleveland, 1903
Rumex obtusifolius L. - F3, P, F, CO=14, Ottawa, 1913
Rumex patientia L. - F3, P, F, CO=4, Beaver, 1913
Rumex pulcher L. - F3, P, F, CO=16, McCurtain, 1930

PONTEDERIACEAE

†*Eichhornia crassipes* (Mart.) Solms - F2W, P, F, CO=2, Payne, 1931

PORTULACACEAE

Portulaca halimoides L. - F3, A, F, CO=5, Cimarron, 1936
Portulaca oleracea L. - F3, A, F, CO=31, Woods, 1913

POTAMOGETONACEAE

Potamogeton crispus L. - F2, P, F, CO=8, Cleveland, 1937

PRIMULACEAE

Anagallis arvensis L. - F3, A, F, CO=6, Delaware, 1961
Anagallis foemina Mill. - F3, A, F, CO=1, Cleveland, 1966
Anagallis minima (L.) E.H.L. Krause - F3, A, F, CO=12, Muskogee, 1927

RANUNCULACEAE

- Clematis terniflora* DC. - F2, P, F, CO=18, Muskogee, 1940
Consolida ajacis (L.) Schur - F3, A, F, CO=19, Cleveland, 1927
Ranunculus muricatus L. - F3, A, F, CO=1, McIntosh, 2001
Ranunculus parviflorus L. - F3, A, F, CO=9, McCurtain, 1938
Ranunculus sardous Crantz - F3, A, F, CO=3, Sequoyah, 1955
Ranunculus testiculatus Crantz - F3, A, F, CO=1, Cimarron, 2014

ROSACEAE

- Aphanes microcarpa* (Boiss. & Reut.) Rothm. - F3, A, F, CO=1, McCurtain, 1984
Duchesnea indica (Andr.) Focke - F3, P, F, CO=7, McCurtain, 1948
†*Potentilla recta* L. - F2W, P, F, CO=38, Cherokee, 1924
Prunus mahleb L. - F3, P, W, CO=2, Pottawatomie, 1967
Prunus persica (L.) Batsch - F3, P, W, CO=19, Muskogee, 1929
†*Pyrus calleryana* Decne. - F3W, P, W, CO=6, Cherokee, 2004
Rosa multiflora Thunb. - F2, P, W, CO=37, Delaware, 1956
Rubus bifrons Vest ex Tratt. - F3, P, W, CO=11, Payne, 1946

RUBIACEAE

- Cruciata pedemontana* (Bellardi) Ehrend. - F3, A, F, CO=15, McCurtain, 1970
Galium aparine L. - F2, A, F, CO=65, Cimarron, 1913
Galium tricornutum Dandy - F3, A, F, CO=1, Hughes, 2006
Sherardia arvensis L. - F3, A, F, CO=35, LeFlore, 1947

RUTACEAE

- Poncirus trifoliata* (L.) Raf. - F3, P, W, CO=6, Bryan, 1962

SALICACEAE

- Populus alba* L. - F3, P, W, CO=11, Pottawatomie, 1932

SAPINDACEAE

- Cardiospermum halicacabum* L. - F2, B, F, CO=35, Unknown (Little River), 1903

SCROPHULARIACEAE

- Chaenorhinum minus* (L.) Lange - F3, A, F, CO=3, Tulsa, 1975
Kickxia elatine (L.) Dumort. - F3, A, F, CO=6, Delaware, 1938
†*Linaria dalmatika* (L.) Mill. - F3, P, F, CO=3, Texas, 1971
Linaria vulgaris Mill. - F3, P, F, CO=13, Cleveland, 1928
Mazus japonicus (Thunb.) Kuntze - F3, A, F, CO=6, Cherokee, 1952
Parentucellia viscosa (L.) Caruel - F3, A, F, CO=1, McCurtain, 2006
Verbascum blattaria L. - F3, B, F, CO=21, Osage, 1913
Verbascum thapsus L. - F2, B, F, CO=38, LeFlore, 1913
Veronica agrestis L. - F3, A, F, CO=5, Payne, 1934
Veronica arvensis L. - F2, A, F, CO=51, Oklahoma, 1920
Veronica hederifolia L. - F3, A, F, CO=4, Tulsa, 1957
Veronica persica Poir. - F3, A, F, CO=10, Delaware, 1961
Veronica polita Fr. - F3, A, F, CO=27, Payne, 1940
Veronica triphyllos L. - F3, A, F, CO=2, Cleveland, 1964

SIMAROUBACEAE

- †*Ailanthus altissima* (Mill.) Swingle - F2W, P, F, CO=27, Cleveland, 1932

SOLANACEAE

- Datura innoxia* P. Mill. - F3, P, F, CO=23, Cherokee, 1951
Datura stramonium L. - F2, A, F, CO=39, Kay, 1913
Lycium barbarum L. - F3, P, V, CO=13, LeFlore, 1914
Nicandra physalodes (L.) Gaertn. - F3, A, F, CO=1, Grady, 2003
Physalis philadelphica Lam. var. *immaculata* Waterf. - F3, A, F, CO=1, Unknown, 1956
Solanum lycopersicum L. - F3, A, F, CO=2, McCurtain, 1976
Solanum physalifolium Rusby - F3, A, F, CO=10, Sequoyah, 1954

SPHENOCLEACEAE

- Sphenoclea zeylanica* Gaertn. - F3, A, F, CO=1, McCurtain, 1983

TAMARICACEAE

- Tamarix chinensis* Lour. - F1, P, W, CO=23, Texas, 1946
Tamarix gallica L. - F1, P, W, CO=49, Oklahoma, 1910
Tamarix parviflora DC. - F1, P, W, CO=15, Cleveland, 1930
Tamarix ramosissima Ledeb. - F1, P, W, CO=44, Cleveland, 1921

URTICACEAE

- Urtica urens* L. - F3, A, F, CO=2, Okmulgee, 2013

ULMACEAE

- Ulmus parvifolia* Jacq. - F3, P, W, CO=13, Payne, 1946
Ulmus pumila L. - F1, P, W, CO=33, Cleveland, 1934

VERBENACEAE

- Verbena bonariensis* L. - F2, B, F, CO=4, McCurtain, 1947
Verbena brasiliensis Vell. - F3, A, F, CO=5, Johnston, 1967

VIOLACEAE

- Viola tricolor* L. - F3, A, F, CO=11, Oklahoma, 1925

XANTHORRHOEACEAE

- Hemerocallis fulva* (L.) L. - F3, P, F, CO=2, LeFlore, 1949
Hemerocallis lilioasphodelus L. - F3, P, F, CO=5, Cherokee, 1959
Ornithogalum umbellatum L. - F3, P, F, CO=13, Kay, 1945

ZYGOPHYLLACEAE

- Tribulus terrestris* L. - F2, A, F, CO=57, Greer, 1912