

## NON-ALLERGENIC NATIVE AND CULTIVATED PLANTS IN OKLAHOMA: LANDSCAPING WITHOUT HAY FEVER

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*Many common landscaping plants produce allergenic pollen. Hay fever patients can reduce their exposure to aeroallergens by selecting non-allergenic species for yards, lawns and streets. The plants listed here are non-allergenic (hypo-allergenic) and possess characteristics desired for landscaping. Categories described include trees, shrubs, vines, perennial herbs and grasses.*

LOCATED IN A CLIMATIC transition zone of central North America, Oklahoma has a broad botanical diversity ranging from the flora of the Rocky Mountain foothills in the northwest to the palmettos and cypress tress of the Mississippi River valley in the southeast. About 2,400 species of vascular plants have been reported in Oklahoma<sup>1</sup> and of these 7.5%, or 181 species, are allergenic.<sup>2</sup> Continuous sampling of the Tulsa atmosphere by the authors<sup>3,4</sup> and The Allergy Clinic of Tulsa<sup>5,6</sup> for a number of years has provided an accurate profile of the seasonal airborne pollen in northeastern Oklahoma. During the late summer and early fall the atmosphere is dominated by the pollen of *Ambrosia* spp. and other weeds abundant in both urban and rural disturbed areas. Early in the summer the grasses constitute the primary airborne pollen originating from lawns, cultivated fields and native prairie vegetation. It should be noted, however, that the native grasses are not important allergens when compared with those occurring in lawns or cultivated fields.<sup>2</sup>

An examination of springtime atmospheric pollen levels shows the most abundant types are maples, hickories, cottonwoods, birches and oaks, all of which are allergenic. Not only are these species the dominants in the native vegetational associations, a casual survey of most urban neighborhoods reveals they are also common ornamentals and are, in fact, recommended for use by major nurseries in the Tulsa area. Since hay fever sufferers wish to limit exposure to allergenic pollen, the use of these plants in landscaping should be

curtailed, especially around schools and homes. This paper presents many of the non-allergenic or hypo-allergenic plants, native or cultivated, that can be used for landscaping in Oklahoma and surrounding states. Although this will not solve hay fever problems, it has been suggested<sup>7</sup> that such a list would provide references for physicians wishing to advise allergy patients on suitable plants for their lawns and yards.

### Methods and Materials

The plant lists and comments presented here result from personal field observations, consultations with local nursery people and landscapers and reports from the botanical, horticultural and allergy literature. For this report plants have been grouped into the following categories: trees, shrubs, vines, herbs and grasses. Although considerable overlap exists between shrubs and trees, the latter are regarded as tall woody perennials with generally one main trunk, while shrubs are much branched perennials and usually without a single stem. It should be noted that environmental conditions may result in a species fitting either classification, e.g., the popular serviceberry (*Amelanchier arborea*).

Vines are elongate, weak-stemmed, often climbing annual or perennial species and may be herbaceous or woody in growth form. Herbaceous plants are non-woody and die back to soil level at the end of the growing season. Grasses are all members of the Gramineae (Poaceae).

The botanical nomenclature of the native flora follows that of Waterfall<sup>1</sup>, while Bailey<sup>8</sup> is used for cultivated species. Since no evidence of differences in allergenicity among varieties, formas, or cultivars within a species were located, all nomenclatural taxa below the species level have been arbitrarily omitted.

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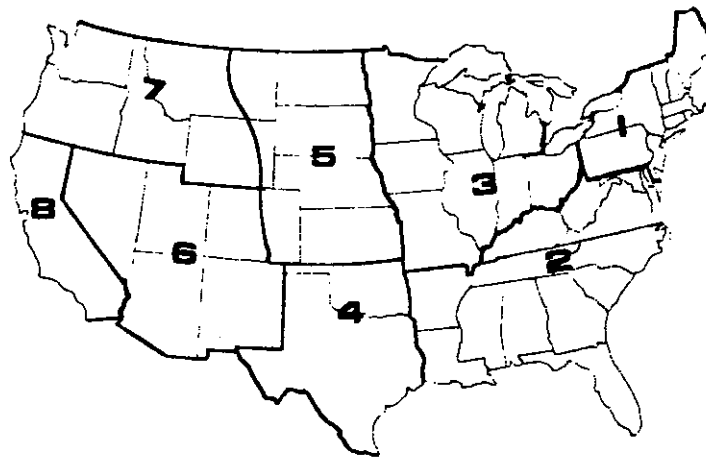


Figure 1. Garden Plant Zones of the U.S.

Table I. Trees (N = native to Oklahoma)

Scientific Name	Common Name	Zones	Comments
<b>ANACARDIACEAE (Cashew Family)</b>			
<i>Cotinus</i> spp.	Smoke tree	2, 4	Attractive, small, fast growing, two species (one N)
<i>Pistacia chinensis</i>	Chinese pistachio	2, 4, 8	Small deciduous
<b>AQUIFOLIACEAE (Holly Family)</b>			
<i>Ilex</i> spp.	Holly	1-8	Several of this large genus are tree-sized, most are shrubs (some N)
<b>BIGNONIACEAE (Bignonia Family)</b>			
<i>Catalpa</i> spp.	Catalpa	1-8	Medium-size, large leaves, purplish, white showy flower clusters
<i>Chilopsis linearis</i>	Desert willow	4, 6, 8	Small, narrow willow-like leaves, showy flowers
<b>CORNACEAE (Dogwood Family)</b>			
<i>Cornus florida</i>	Flowering dogwood	1-8	Showy flower clusters and scarlet fall foliage (N)
<b>ELAEAGNACEAE (Oleaster Family)</b>			
<i>Elaeagnus angustifolia</i>	Russian olive	1-8	Attractive with silvery leaves, drought tolerant
<b>LEGUMINOSAE (Pea or Bean Family)</b>			
<i>Cercis canadensis</i>	Redbud	2, 3, 4, 5	State tree: early pink flowers (N)
<i>Cladrastis kentuckea</i>	American yellowwood	2, 3, 4, 5	Medium size with attractive hanging flower clusters (N)
<i>Gleditsia triacanthos</i>	Honey locust	1-5	Medium to tall; thornless varieties used in streets and as shade trees (N)
<i>Gymnocladus dioica</i>	Kentucky coffee tree	1-5	Medium size with an open growth form (N)
<i>Sophora japonica</i>	Japanese pagoda-tree	2, 4, 6, 8	Feathery leaved, attractive flower clusters in late summer
<b>MAGNOLIACEAE (Magnolia Family)</b>			
<i>Liriodendron tulipifera</i>	Tulip poplar	1-5	Tall with greenish-yellow to orange magnolia-like flowers
<i>Magnolia grandiflora</i>	Southern magnolia	2, 4	Evergreen with large showy flowers in June
<i>Magnolia Soulangeana</i>	Star-saucer magnolia	1-5	Deciduous with early spring flowers
<b>MELIACEAE (Mahogany Family)</b>			
<i>Melia azedarach</i>	Chinaberry	2, 4	Widely planted for shade and attractive flowers
<b>NYSSACEAE (Nyssa Family)</b>			
<i>Nyssa sylvatica</i>	Tupelo, sourgum	1-4	Medium, brilliant autumn colors, excellent shade tree (N)
<b>PINACEAE (Pine Family)</b>			
<i>Picea pungens</i>	Colorado blue spruce	1-8	Should be considered suspect allergen due to conflicting reports
<b>ROSACEAE (Rose Family)</b>			
<i>Amelanchier arborea</i>	Serviceberry	1-5	Small with drooping clusters of showy white flowers (N)
<i>Crateagus</i> spp.	Hawthorn	1-8	Large variable genus of thorny small trees or large shrubs (some N)
<i>Malus</i> spp.	Apple	1-8	Small, deciduous, both fruit and ornamental varieties
<i>Prunus</i> spp.	Stone fruits	1-8	Several species of small deciduous trees; both fruit and ornamental (some N)
<i>Pyrus</i> spp.	Pear	1-8	Medium size, both ornamental and fruit varieties (some N)
<i>Sorbus aucuparia</i>	European mountain ash	1-8	Rapid growth with bright red fruit and attractive leaves
<b>RUTACEAE (Rue Family)</b>			
<i>Poncirus trifoliata</i>	Trifoliolate orange	1-5, 8	Small with fragrant white flowers, orange-like fruit, hardy
<b>SALICACEAE (Willow Family)</b>			
<i>Salix babylonica</i>	Weeping willow	1-8	Sheds large amounts of pollen and should be considered as suspect allergen
<b>SAPINDACEAE (Soapberry Family)</b>			
<i>Koelreuteria paniculata</i>	Goldenrain tree	1-5	Attractive small ornamental, yellow flower clusters in summer
<i>Sapindus drummondii</i>	Western soapberry	2, 4, 5, 6	Small tree (N)
<b>STYRACACEAE (Storax Family)</b>			
<i>Halesia carolina</i>	Carolina silverbell	2, 4	Small, clusters of showy-white bell shaped flowers (N)

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Table II. Shrubs (N = native to Oklahoma)

Scientific Name	Common Name	Zones	Comments
ANACARDIACEAE (Cashew Family) <i>Rhus glabra</i>	Smooth sumac	1-8	Spectacular fall color (N)
AQUIFOLIACEAE (Holly Family) <i>Ilex</i> spp.	Holly	1-8	Over 300 species, well known for foliage and red berries (some N)
BERBERIDACEAE (Barberry Family) <i>Berberis Julianae</i>	Wintergreen barberry	4-7	Possible alternate host for wheat stem rust
<i>Berberis Thunbergii</i>	Japanese barberry	4-7	Small, deciduous, immune to wheat rust
<i>Mahonia Aquifolium</i>	Holly mahonia	4-7	Spiny leaved shrub to three feet
<i>Mahonia Bealei</i>	Barberry	4-7	Tall evergreen
<i>Nandina domestica</i>	Nandina	1-5, 8	Evergreen grown for bright red berries
BUXACEAE (Box Family) <i>Buxus</i> spp.	Boxwood	1-8	Leathery-leaved evergreen, grown for hedges and edging
CATAACEAE (Cactus Family) Cacti	Cacti	4, 5, 6, 8	Diverse growth forms, drought resistant (some N)
CAPRIFOLIACEAE (Honeysuckle Family) <i>Abelia</i> spp.	Bush honeysuckle	1-8	Medium hedge with small leaves
<i>Viburnum</i> spp.	Viburnum	1-8	Ornamentals, some suspected allergenic (some N)
CELASTRACEAE (Staff-tree Family) <i>Euonymus</i> spp.	Spindle tree	1-8	Many species, climbing or shrubby (some N)
CORNACEAE (Dogwood Family) <i>Aucuba japonica</i>	Aucuba	1-8	Evergreen, waxy leaves flecked with yellow
<i>Cornus</i> spp.	Dogwood	1-8	Similar to flowering dogwood, with scarlet fall foliage (some N)
ELAEAGNACEAE (Oleaster Family) <i>Elaeagnus pungens</i>	Oleaster	1-8	Evergreen, spiny, fall blooming
ERICACEAE (Heath Family) <i>Rhododendron</i> spp.	Azalea	1-8	Abundant spring flowers, several species (some N)
LABIATAE (Mint Family) <i>Salvia greggi</i>	Autumn sage	2-5, 8	Fall blooming with bright red to purple flowers
LEGUMINOSAE (Pea or Bean Family) <i>Sophora secundiflora</i>	Mescal bean	2, 4, 6, 8	Evergreen, fragrant yellow flowers
LILIACEAE (Lily Family) <i>Yucca</i> spp.	Yucca	2, 4, 5, 6, 8	Many species with showy white flowers, drought tolerant (some N)
LYTHRACEAE (Loosestrife Family) <i>Lagerstromemia indica</i>	Crape myrtle	2, 4, 8	Pink or red flowers, highly tolerant of Oklahoma heat
MALVACEAE (Mallow Family) <i>Hibiscus</i> spp.	Hibiscus	1-8	Many species including Rose-of-Sharon
OLEACEAE (Olive Family) <i>Forsythia</i> spp.	Golden bells	1-8	Popular ornamental with yellow flowers (closely related to ash—suspect)
<i>Osmanthus americanus</i>	Devil wood	2, 4	Tall white flowered evergreen
<i>Syringa vulgaris</i>	Lilac	1-8	Small clusters of fragrant flowers
PITTOSPORACEAE (Pittosporum Family) <i>Pittosporum</i> spp.	Pittosporum	2, 4, 6, 8	Evergreen, whorled-leaves, flowers white with orange blossom fragrance
ROSACEAE (Rose Family) <i>Chaenomeles</i> spp.	Flowering quince	1-8	Bright pink early flowers
<i>Photinia serrulata</i>	Photinia	2, 4, 6, 8	Tall evergreen with large oblong leathery leaves
<i>Pyracantha</i> spp.	Firethorn	1-8	Thorny evergreen with orange to crimson fruit
SAXIFRAGACEAE (Saxafrage Family) <i>Hydrangea</i> spp.	Hydrangea	1-8	Large pink, white or blue flower clusters (some N)
TAXACEAE (Yew Family) <i>Taxus</i> spp.	Yew	1-8	Erect or spreading shrubs, needle-leaved, pollen morphologically similar to <i>Juniperus</i> -suspect
THEACEAE (Tea Family) <i>Camellia japonica</i>	Camellia	2, 4, 8	Large shrub with showy fragrant flowers
<i>Camellia Sasanqua</i>	Camellia	2, 4, 8	Low shrub, large white flowers
<i>Cleyera japonica</i>	Sakaki	2, 4, 8	Evergreen shrub with small white flowers
VERBENACEAE (Vervain Family) <i>Vitex</i> spp.	Chaste tree	2, 4, 6, 8	Spikes of blue-violet flowers in late summer

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**Table III. Vines (N = native to Oklahoma)**

Scientific Name	Common Name	Zones	Comments
ARALIACEAE (Ginseng Family) <i>Hedera Helix</i>	English Ivy	1-8	Common ivy for fence, wall and ground cover, many varieties
BIGNONIACEAE (Bignonia Family) <i>Campsis radicans</i>	Trumpet creeper	1-5	Aggressive and rapid growing (N)
CELASTRACEAE (Staff-tree Family) <i>Euonymus</i> spp.	Euonymus	1-8	Numerous evergreen shrubby or climbing species (some N)
LEGUMINOSAE (Pea or Bean Family) <i>Wisteria sinensis</i>	Wisteria	2, 4, 8	Fast growing woody twiner with showy purple-blue flower clusters
LOGANIACEAE (Logania Family) <i>Gelsemium sempervirens</i>	Yellow jesamine	2, 4, 8	Fragrant spring flowers
PASSIFLORACEAE (Passion Flower Family) <i>Passiflora</i> spp.	Passion Flower	2, 4, 8	Beautiful and unique flower (some N)
RANUNCULACEAE (Crowfoot Family) <i>Clematis</i> spp.	Virgin's bower or Clematis	1-8	Many species with large showy flowers (some N)
VITACEAE (Grape Family) <i>Parthenocissus quinquefolia</i>	Virginia creeper	1-8	Deciduous, fast growing with spectacular fall color (N)
<i>Parthenocissus tricuspidata</i>	Japanese ivy	1-8	High climbing vine
<i>Vitis</i> spp.	Grape vine	1-8	Many native and cultivated varieties (some N)

### Results and Discussion

Plants listed in Tables I through V are non-allergenic or hypoallergenic species that have been selected by the authors based on the suitability of the plants for landscaping, their ability to survive Oklahoma's variable weather and their botanical interest. The latter is a subjective evaluation based upon the professional judgement and personal preferences of the authors and consequently some familiar species have not been included. No effort was made to include the many species unable to survive Oklahoma winters, thus eliminating the annuals. Although the ability to adapt to Oklahoma's climate was a major factor in the selections, these plants will also thrive in other parts of the country. The 48 contiguous states have been divided into eight general growing zones (Figure 1) and the appropriate zones listed beside each entry in Tables I through V.

Several plants in these tables are listed as suspect allergens. In some cases (*Picea pungens*, *Salix babylonica*, *Taxus* spp.) a plant was considered suspect because it is related to others known to have highly allergenic pollen, even though the particular species listed is not known to be allergenic. For a number of reasons all grasses should be considered suspect: many are highly allergenic; all are in the same botanical family (Gramineae); all possess morphologically similar pollen; and cross reactivity is known to exist among members of the family.<sup>9</sup> It should be pointed out that many grass-associated problems may be obviated by frequent cutting, thus keeping the plants short and preventing flowering.

Some species have been listed as suspect as a result of reports in the literature. In 1979 Lewis and Vinay<sup>10</sup> reviewed the subject of pollinosis due to insect pollinated plants. Numerous species cited in that work have long been known as factors in hay fever (e.g., *Albizia*,

*Brassica*, *Chrysanthemum*, *Liqustrum*, *Olea*) while others were included since a small number of atopic patients, based on skin test data, were thought to be sensitive to the pollen. Since the clinical significance in many cases is unclear, the following plants were not excluded but listed as suspect; *Cornus*, *Catalpa*, *Euonymus*, *Magnolia*, *Rhododendron* and *Syringa*. It is possible that in some of these plants the allergenic response may be a result of direct sniffing of pollen onto the mucous membranes or by volatile oils produced by the flowers. Lewis and Vinay also noted that while individual specimens of *Malus*, *Prunus* and *Pyrus* may cause few problems, wherever large orchards exist mildly significant clinical symptoms may occur in a few persons exposed to the pollen.

In recommending or selecting plants for landscaping, care should be taken to avoid any indicated as suspect in the same botanical family with species causing problems. The final selection should be made in consultation with knowledgeable personnel at a local nursery for proper identification and advice on care, maintenance and suitability for specific areas.

It should be pointed out that the plants listed here are regarded as non-allergenic or hypo-allergenic based upon current knowledge. Additional research or testing may demonstrate some of these to be allergenic. The authors welcome communications on this topic from physicians who may be aware of significant problems caused by any of these plants.

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**Table IV. Herbs (N = native to Oklahoma)**

Scientific Name	Common Name	Zones	Comments
<b>AMARANTHACEAE (Amaranth Family)</b> <i>Celosia argentea</i>	Cockscomb	1-8	Reported entomophilous but from allergenically important family
<b>AMARYLLIDACEAE (Amaryllis Family)</b> <i>Amaryllis</i> spp.	Amaryllis	1-8	Bulbous spring and summer bloomer
<b>APOCYNACEAE (Dogbane Family)</b> <i>Vinca major</i>	Periwinkle	1-8	Trailing evergreen
<b>ARACEAE (Arum Family)</b> <i>Arisaema triphyllum</i> <i>Colocasia esculenta</i> <i>Zantedeschia aethiopica</i>	Jack-in-the-Pulpit Elephant ears Calla	1-8 2, 4, 6, 8 2, 4, 6, 8	Unusual spring flowers (N) Large-leaved coarse herb Robust plant over 2.5'
<b>ASCLEPIADACEAE (Milkweed Family)</b> <i>Asclepias tuberosa</i>	Butterfly weed	1-8	Orange flowered milkweed (N)
<b>BALSAMINACEAE (Balsam Family)</b> <i>Impatiens</i> spp.	Snapweed	1-8	Erect, soft and fragile, explosive fruit (some N)
<b>BORAGINACEAE (Borage Family)</b> <i>Mertensia virginica</i>	Virginia bluebells	1-8	Popular 1 to 2' garden plant
<b>CAMPANULACEAE (Bellflower Family)</b> <i>Campanula</i> spp. <i>Platycodon grandiflorum</i>	Bellflower Balloon-flower	1-8 1-8	Tall or dwarf border plant (one N) Showy, to 3.5'
<b>CANNACEAE (Canna Family)</b> <i>Canna</i> spp.	Canna	1-8	Tall hedge-former
<b>CARYOPHYLLACEAE (Pink Family)</b> <i>Arenaria verna</i> <i>Dianthus</i> spp. <i>Gyposphila</i> spp. <i>Saponaria ocymoides</i>	Irish moss Carnation, pink Baby's breath Mediterranean pink	1-8 1-8 1-8 2, 4, 6, 8	Low, edge-former Many forms, 6 to 36" Low growing, popular for borders Trailing and much branched to 9"
<b>COMMELINACEAE (Spiderwort Family)</b> <i>Tradescantia virginiana</i>	Spiderwort	1-8	Spring blooming (N)
<b>CRASSULACEAE (Orpine Family)</b> <i>Sedum</i> spp. <i>Sempervivum</i> spp.	Sedum Hen and Chicks	1-8 1-8	Creeping nearly evergreen succulent Popular succulent
<b>FERNS</b> Ferns	Ferns	1-8	Numerous species (some N)
<b>FUMARIACEAE (Fumitory Family)</b> <i>Dicentra</i> spp.	Bleeding-heart and Dutchman's breeches	1-8	Low delicate and early flowering (some N)
<b>IRIDACEAE (Iris Family)</b> <i>Gladiolus</i> spp. <i>Iris</i> spp.	Gladiolus Iris, Fleur-de-lis	1-8 1-8	Numerous cultivated forms Numerous forms, both spring and summer (some N)
<b>LABIATAE (Mint Family)</b> <i>Ajuga reptans</i>  <i>Physostegia virginiana</i>	Bronze beauty ajuga  Dragonhead	1-8  1-8	Low spreading mint, less than foot high, good ground cover Erect and leafy, to 4', with showy reddish flowers (N)
<b>LILIACEAE (Lily Family)</b> <i>Convallaria majalis</i> <i>Hemerocallis</i> spp. <i>Trillium grandiflorum</i>	Lily-of-the-Valley Daylily Wake Robin	1-8 1-8 1-8	Both white and pink flowered forms Scapose and spring flowering Easter, spring blooming
<b>MALVACEAE (Mallow Family)</b> <i>Althaea rosea</i>	Hollyhock	1-8	Tall, leafy-stemmed biennial
<b>NYCTAGINACEAE (Four-O'clock Family)</b> <i>Mirabilis jalapa</i>	Four-O'clock	1-8	Easily established hedge-former
<b>ORCHIDACEAE (Orchid Family)</b> <i>Cypripedium</i> spp.	Lady Slipper	1-5, 8	Short stemmed, few leaved, outstanding flower (one N)
<b>PAPAVERACEAE (Poppy Family)</b> <i>Papaver</i> spp.	Poppy	1-8	Showy flowers, occasionally subshrub
<b>PRIMULACEAE (Primula Family)</b> <i>Dodecatheon meadia</i>  <i>Primula polyantha</i>	Shooting star  Primula	1-8  1-8	White, pink or blue flowering and low growing (N) Low growing, spring blooming
<b>RANUNCULACEAE (Crowfoot Family)</b> <i>Aquilegia</i> spp.  <i>Delphinium</i> spp.  <i>Paeonia</i> spp.	Columbine  Larkspur  Peony	1-8  1-8  1-8	Numerous species and varieties, Colorado state flower (some N) Beautiful garden flower but poisonous to cattle (some N) Popular herb or subshrub
<b>ROSACEAE (Rose Family)</b> <i>Geum</i> spp. <i>Potentilla</i> spp.	Avens Cinquefoil	1-8 1-8	Numerous cultivated forms Mostly herbs, few shrubs
<b>UMBELLIFERAE (Parsley Family)</b> <i>Aegopodium podagraria</i>	Snow-on-the-Mountain	1-8	Low growing, used for edging and mats
<b>VERBENACEAE (Vervain Family)</b> <i>Verbena</i> spp.	Verbena	1-8	Both early and late blooming forms (some N)
<b>VIOLACEAE (Violet Family)</b> <i>Viola</i> spp.	Violets, Pansey	1-8	Low growing, long flowering (some N)

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**Table V. Grasses (Gramineae or Grass Family) (N = native to Oklahoma)**

Scientific Name	Common Name	Zones	Comments
<i>Arundinaria gigantea</i>	Giant cane	2, 3, 4, 8	Tall ornamental spreading by rhizomes (N)
<i>Bambusa</i> spp.	Bamboo	2, 4, 8	Tall, border grass
<i>Eremochloa ophiuroides</i>	Centipedegrass	2, 4, 8	Lawn grass forming dense turf
<i>Phragmites communis</i>	Reed grass	1-8	Tall ornamental border grass, large plumes, freely spreading
<i>Zoysia</i> spp.	Zoysia	1-8	Fine and coarse textured lawn grasses

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