



16. Who Grows Where?

Bosque Plants

Description: Students place plants into the proper habitat on the bosque model. As the model changes with human alteration students add exotic plants and change the location of other plants based on changes in the habitat.

Objective: Students will:

- become familiar with some plants that grow in the bosque; and
- be able to differentiate between native and exotic plants.

Materials: Drawings of the plants, descriptions of the plants, and “Changing River” activity materials for Rio Bravo and Rio Manso.

Procedure:

1. Cut out the plant pictures and information cards for each plant. The cards should be cut apart. (There is only one description card for each plant, targeted for upper elementary and middle school students.) We recommend copying the Rio Bravo plants and descriptions on a different color paper than the Rio Manso plants. You may want to code the pictures and descriptions so they can be matched after being mixed up. (A list is included here.) Make sure the name of the plant appears only on the picture and not the description.
2. Familiarize the students with the vocabulary, go over the parts of a plant and introduce botanical terms (see “Common Botanical Terms” in the activity “A Rose by Any Other Name” in Chapter 3).

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Grades: 7–12

Time: material preparation: 15–20 minutes. Activity: one 40-minute class period

Subjects: science

Terms: *catkins, germinate, pollination, riparian, petals, sepals, stamens, panicle, alkaline, rhizome, spikelet, floret, spores, basal, alkaloids, genus, species, phreatophyte, awn. Some common words with special plant meanings: trunk, diameter, opposite, alternate, teeth (on leaf edges), simple, compound, annual, perennial*



Section A: Rio Bravo

3. Set up the river as Rio Bravo (see the activity “Changing River”).
4. Option a: Plant Match: Pass out the descriptions of the Rio Bravo plants and the plant drawings to the students, making sure that students do not receive the same drawing that they have a description for. Take turns, with each student reading a description. Students should guess what plant is being described. The student who has the corresponding drawing should place the plant on the model in the habitat that was described in the reading. Continue around the room until all of the plant cards are read and plant drawings are placed on the model.
- or Option b: If you have less class time, hand out the plants with their matching descriptions to the students. Each student should have at least one plant of his or her own. Have the student carefully read the description and decide where that plant grows. What is its habitat? Students should then place the plant on the bosque model in a location where it would grow best. Place them on the Rio Bravo bosque—before the ditches, levees and homes. Have each student describe his or her plant and where it grows to the entire group.

Section B: Rio Manso

5. Now transform the river to Rio Manso (see “Changing River” activity) by adding the human alterations to the bosque model: irrigation ditches, levees, jetty jacks, etc.
6. Ask the students if the habitats where their plants were originally growing have changed. Can the plants still live there? Move the plants to a better habitat if necessary. The students may want to remove some of the wetter plants such as cattails and sedges, but they may also find a place for them. The students can also move some of the upland plants such as one-seed juniper and four-wing saltbush into the bosque to signify that the bosque is now drier.
7. Using the same method (Option A or Option B) in Step 3, add the introduced species to the model. Do the students think that the introduced plants could compete with the native plants?

Section C: Rio Nuevo

8. Discuss what impacts restoration projects can have on these plants (Rio Nuevo changes). Using restoration project ideas from the “Changing River” or ideas from the students themselves, adjust the cards (such as removing exotic species) based on student discussion.



- Extensions:**
1. Combine this activity with “Who Lives Where” to compare animals and plants. Look for opportunities to place animals on the model with the plants that provide their food or shelter.
 2. Use the animal cards from “Who Lives Where” with these plant cards to do “The Web” activity in Chapter 5 of this guide.
 3. Oral history extension: send plant drawings home with students to ask elders about local names, uses of the plants, and stories about them.

Who Grows Where? Rio Bravo

Common Name	Scientific Name
Rio Grande cottonwood	<i>Populus deltoides</i> subsp. <i>wislizenii</i>
New Mexico olive	<i>Forestiera neomexicana</i>
Coyote willow	<i>Salix exigua</i>
One-seeded juniper	<i>Juniperus monosperma</i>
False indigo	<i>Amorpha fruticosa</i>
Western virgin’s bower	<i>Clematis ligusticifolia</i>
Screwbean mesquite	<i>Prosopis pubescens</i>
Wolfberry	<i>Lycium pallidum</i>
Prickly pear	<i>Opuntia</i> spp.
Giant sacaton	<i>Sporobolus wrightii</i>
Sedge	<i>Carex</i> spp.
Saltgrass	<i>Distichlis spicata</i>
Smooth scouring rush or horsetails	<i>Equisetum laevigatum</i>
Yerba mansa	<i>Anemopsis californica</i>
Hooker’s evening primrose	<i>Oenothera hookeria</i>
Broad-leaved cattail	<i>Typha latifolia</i>
Sacred datura	<i>Datura wrightii</i>
Sunflower	<i>Helianthus annuus</i>
Spectacle pod	<i>Dithyrea wislizenii</i>

Who Grows Where? Rio Manso

Saltcedar	<i>Tamarix chinensis</i>
Tree of heaven	<i>Ailanthus altissima</i>
White sweet clover	<i>Melilotus alba</i>
Russian olive	<i>Eleagnus angustifolia</i>
Cheatgrass	<i>Bromus tectorum</i>
Kochia	<i>Kochia scoparia</i>

Who Grows Where?

Drawings by Robert DeWitt Ivey (RDI)
and George Mauro (GM)

241



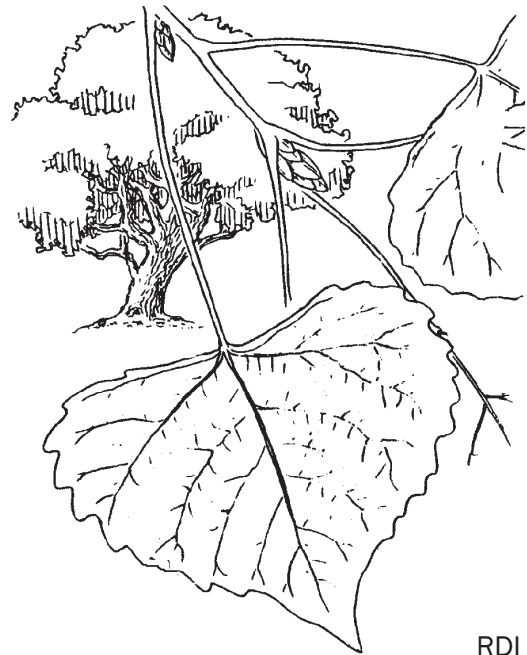
Student River Activity

Part 1: Rio Bravo

A majestic landmark species of the bosque, my trunk can reach 5 feet (1.5 meters) in diameter. My heart-shaped leaves have toothed edges. In autumn they turn yellow making the bosque appear as a river of gold. You can tell my sex in the spring. Male trees have red flowers that form conspicuous long clusters, or catkins, that produce pollen. The female flowers are hard to spot until they develop grape-like clusters of seed pods, or tetones. Having evolved along the Rio Grande, I take advantage of high spring water runoff. In the late spring my seed capsules pop open and billions of minute cottony down-covered seeds are carried into the sky by wind. To grow they must land on moist, bare soil where they can receive a full day's sunlight. Once I sprout, my roots must keep in contact with the moist soil as the water recedes and the water table drops.

Rio Grande Cottonwood

Populus deltoides subsp. *wislizenii*



I grow as an erect spreading shrub that can reach 10 feet or 3 meters tall. I have a smooth, whitish-green bark that makes me distinctive even in the winter when I have no leaves. My bright green oval-shaped leaves are arranged oppositely on my twigs. My flowers bloom in the spring before my leaves emerge. Although my small flowers have no petals, the stamens give the flowers a yellowish cast. Once pollinated, my flowers mature to small blue-black olive-shaped fruits that are attractive to birds. I am native to the bosque and like both dry and moist soils. My roots can grow over ten feet or 3 meter deep. My hard wood has been used by Native Americans for digging sticks and for making prayer sticks.

New Mexico Olive

Forestiera neomexicana



Flood waters don't bother me because my limber branches can ride in the water without my roots being torn from the soil. I like to grow in thickets along the edge of the river or streams. I am one of the most common riparian shrubs in New Mexico. I can grow into a 15-foot (5-meter) tall tree, but mostly I appear as a small shrub. My male flowers grow in tight, dense clusters called catkins. My female catkins have loosely arranged flowers that produce seeds with hairy filaments that are easily distributed by the wind. My long, lance-shaped, minutely toothed leaves are silvery early in the summer because of fine hairs. As the hair wears off I look more dull grayish green. Wildlife such as elk and beaver like to eat my branches. Like other members of the Salicaceae family, I have bark from which tea can be brewed and used to relieve pain.

Coyote Willow

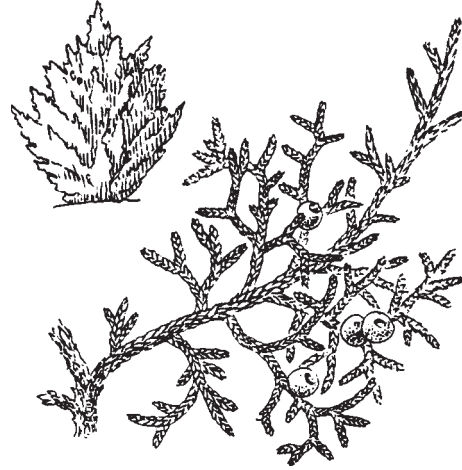
Salix exigua



I am one of the most common small trees in New Mexico. I like to live in dry rocky plains, hills and mountains where I often grow with pinyon pine. I look brushy since my many branches grow from an underground trunk. Tiny scale-like leaves cover my twigs. My sometimes frosty-looking fruit appears to be dark blue to copper berries, but they are really cones. Birds and mammals, especially bear, like to eat my cones. My leaves, twigs, berries and bark smell wonderfully pungent. Navajos have used my bark for clothes, blankets and shoes. I do not grow in areas that flood or have high water tables, so the foothills, not the bosque, are my more common home.

One-seed Juniper

Juniperus monosperma

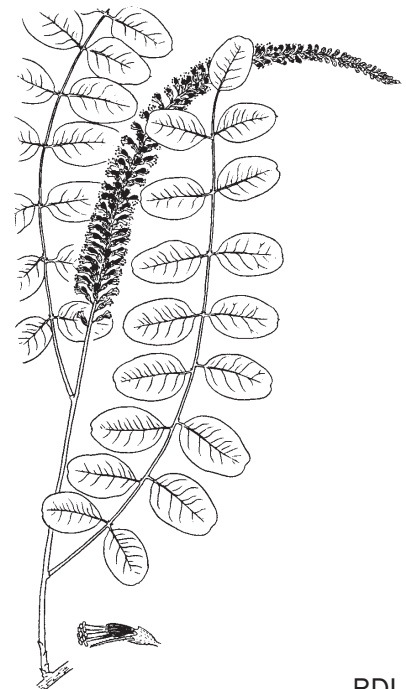


RDI

Look closely: my deep blue-violet flowers, from which I get my name, have only one petal. Stamens covered with bright yellow pollen extend beyond the petal. My flowers are grouped together in long, dense clusters at the end of my branches. I am a woody plant that usually grows about 6 feet (2 meters) tall. A member of the pea family, I have compound leaves with many opposite oval leaflets that are sometimes mistaken for locust leaves (I am not a locust!). I grow in moist, sandy soil near levees and places where water is close to the surface. My many branches make nice places for bird nests.

False Indigo

Amorpha fruticosa



RDI

I am a vine that likes dry conditions. Also called old-man's beard, I have stems that grow along the ground or up into trees. My seeds form cotton-like masses of hairy fruits. I have no petals, but the sepals of my flower are creamy or purplish-brown in color and therefore look like petals. My leaves are opposite each other on a long slender vine and have three lobes, each with teeth or lobes of their own. As a perennial, I can be found in the same place year after year. I am a member of the buttercup family.

Western virgin's bower

Clematis ligusticifolia



RDI

I am a spiny shrub or small tree with slender branches. My fruit look like screws. Each bean is coiled in a spiral with the same diameter. My compound leaves have four to eight pairs of small oval leaflets. My flowers are yellow to yellow-green or pale green in color with anthers ending in red glands. My fruit is sweet to taste and is eaten by humans, coyotes, and roadrunners. I have spines or thorns along my stems. My thorns are sometimes used by a bird called a loggerhead shrike as a place to store grasshoppers or lizards it plans to eat later. I grow well in the desert washes and dry streams that sometimes flow into the Rio Grande.

Screwbean mesquite

Prosopis pubescens



RDI

Red berries hang from my thorny stems during the summer and attract birds. I look like a mound of woody stems, with small narrow leaves in clusters on short spiky branches. In the winter I provide a little greenery. My early flowers are green lavender and shaped like tiny funnels and attract insects. Besides the berries, birds use me for cover and protected roosts at night. Native Americans used me for food: my slightly bitter, juicy berries were eaten raw or prepared as a sauce.

Wolfberry

Lycium pallidum



RDI

A common member of the cactus family, I like the sandy soils of the bosque. Often I am planted as an ornamental and have escaped to grow there. Livestock avoid eating me, leaving me alone to grow into huge clumps. My stems are flattened pods, and what would be leaves on other plants are sharp prickly spines that grow in a pattern. My fruits are large and red to purple, juicy, and pear-shaped, containing many seeds. Wildlife and many people eat them. Sometimes the fruit is made into jelly. It is evident when coyote eat me: their poop is the same red color and full of my seeds. That is how I spread from place to place. In the bosque I may have bright yellow flowers that all kinds of pollinators visit.

Prickly pear

Opuntia spp.



RDI

A native grass, I am adapted to living in dry soil but I also can be found near stream banks. I am a perennial and grow well in hard-packed alkaline soils. My panicle or seedheads are 20 to 60 cm long and the branchlets are densely flowered, producing many seeds for birds and small mammals. I grow in thick clumps and can reach heights of six feet. My leaves are long, sword-shaped and tender to eat when young. As I grow older leaves are tough and less tasty. I provide cover for ground nesting birds and lizards.

Giant Sacaton

Sporobolus wrighti

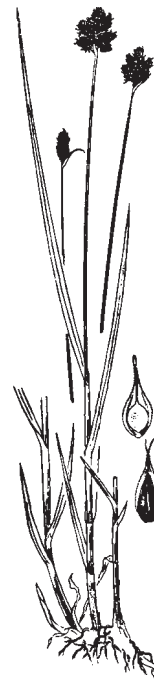


RDI

I am a grass-like aquatic plant that grows along the banks of rivers and in marshes or shallow ponds. My stiffly edged stem is triangle shaped and has three long grass-like leaves. They sheath or wrap around the stem. I have seed clusters or nutlets that grow close to the stem. Ducks, Canada geese and muskrats will uproot me to eat. Dragonfly and mayfly nymphs crawl from the water up my stem and emerge in their adult form. Native leopard frogs hide from bullfrogs where I grow thickly. Many people use my name in the rhyme “___ have edges” to remember my triangular stem.

Sedge

Carex spp.

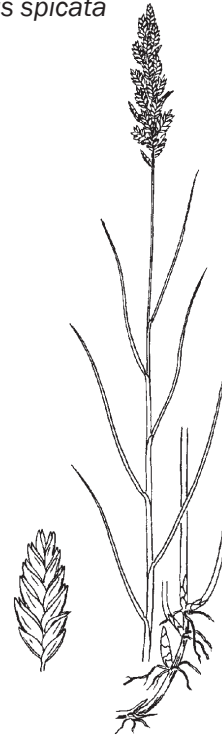


RDI

A native grass, I grow well in sandy alkaline (salty) soil of flood plains, swales or salt flats. I am a perennial and spread by vigorously growing underground stems called rhizomes. My long and slender leaves are opposite and sheath or wrap around the stem. The seed head appears condensed with many branches (spikelets) of tightly arranged flowers (florets) that each produce a seed or grain. Small mammals eat these seeds. I grow in clumps and prevent soil from eroding. I produce much plant material that decays and becomes part of the soil.

Saltgrass

Distichlis spicata

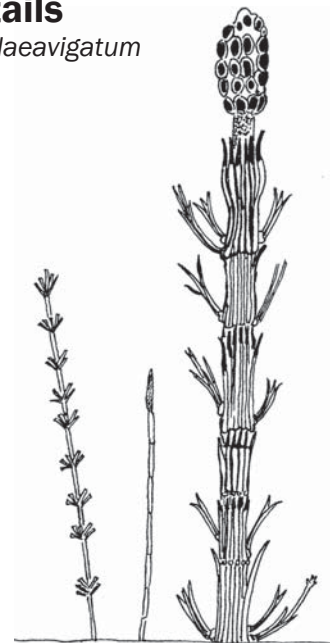


RDI

I am an unusual looking plant. I grow along ditch banks, streams or rivers where my roots can reach the water. My stem is thick and contains tube-like conducting tissues around a hollow center. Solid joints connect my stem segments. Instead of seeds I produce spores from a cone. I have been around for 250 million years and once grew as large as a tree. One of my common names comes from the long striations of my stem and the cone-like tip. Another name comes from the high concentration of silica in the stem, which can be gathered and used to scrub dishes and pans when camping.

Smooth Scouring Rush or Horsetails

Equisetum laevigatum



GM

I am known as one of the most used herbs of Spanish and Puebloan cultures. I grow in thick stands where the ground stays moist such as stream beds, low banks of a river or marshes. My broad basal leaves are 3 to 6 inches (7-15 cm) long, stand erect and are rounded at the tip. The thick leaves contain lots of moisture and often have a reddish-silvery edge. My flowers form a cone-shaped white spike with six white bracts about the base that look like petals. In the fall my stems, leaves and flowers turn brick red. My leaf stems will sprout roots to form colonies. I smell really strong and earthy. People use me for medicine for inflammation resulting from irritation, injury or infection.

Yerba Mansa

Anemopsis californica



RDI

A tall herb, I grow up to four feet tall with a stiff, erect, hairy stem. My large delicate yellow flowers open in the evening with four petals and eight large stamens. My leaves are long and lance-shaped with occasional teeth. Hawk moths, bats and bees pollinate me early in the morning. By the middle of the day my bloom has closed, wilted and turned an orange-red color. When my seed capsules mature, they pop open at the slightest touch to propel the seeds away from me. I grow best in moderately dry to moist soil in disturbed areas and open fields.

Hooker's Evening Primrose

Oenothera hookeria



GM

My female flowers form a dense, dark brown sausage-like cluster on a tall stiff stem. The male flowers that grow above this cluster leave a bare stem when they fly away after producing pollen. My seed head fluffs out when my seeds are dispersing. My sword-like leaves are flat, strap-like and spongy and wrap around the stem as they grow. I grow in wet places like marshes and ponds all over the world except where it is really cold. My new shoots taste like cucumbers, my green flower heads can be roasted like corn on the cob. My rootstalks can be eaten raw, roasted over hot coals or dried and ground into meal. Muskrats, geese and elk also eat my roots. Marsh hens, red-winged blackbirds, waterfowl and shorebirds use my leaves as nesting cover.

Broad-leaved Cattail

Typha latifolia



RDI

All of my parts are poisonous, even to the touch. A chemical called atropine and alkaloids, which depress the nervous system, are contained in my system. My large beautiful white, trumpet-shaped flowers open at night to attract sphinx or hawk moths, bats, beetles and bees. During the day I am visited by hummingbirds attracted to my heavily scented flowers. By midday my flower fades to a cream color tinged with lavender, closes and becomes limp. I am a large mounded, spreading dark green plant that grows up to six feet across. My leaves are a dusky green-gray, triangular in shape and strongly veined. When developed my seeds are in a spine-covered one- to two-inch ball called a capsule that smells musty. My roots are large top-shaped tubers. I grow in deep, well-drained loose soil in eroded arroyos and disturbed areas.

Sacred Datura

Datura wrightii



RDI

You might think I have big, showy flowers, but really those are hundreds of tiny flowers compressed into one flower-like head called a composite. Showy yellow to orange ray flowers surround the brown disk flowers that produce my seeds. My seeds are eaten by birds, squirrels, and even people. I am also used in making soap, paint and cosmetics. My heavy, stiff, hairy and rough stalk can grow up to 10 feet (3 m) tall. My leaves are alternate and simple, rough and hairy, oval to heart shaped with toothed edges. Sometimes I have one very large flower head filled with nutritious seeds. Other times I produce many branches covered with flowers. Ladybugs, black ants, aphids and bees find food in my flowers and in turn are stalked by spiders and praying mantis. I provide erosion control by growing in places where soil is disturbed and grass is not competing for nutrients.

Sunflower

Helianthus annuus

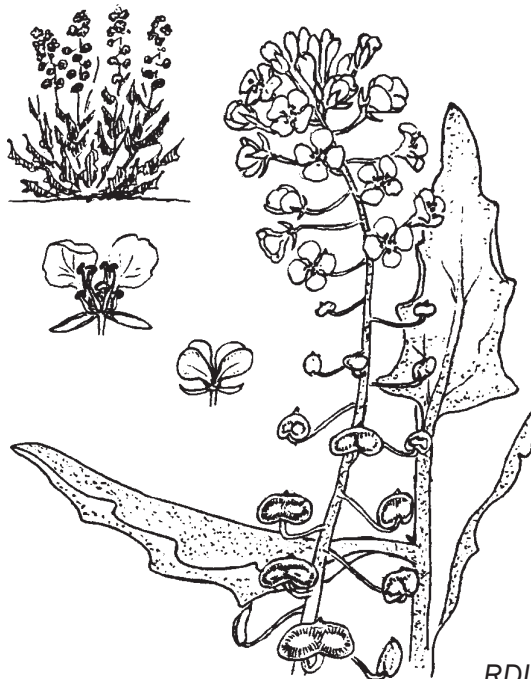


RDI

My genus name means “two shields” in Greek. My fruit pod resembles a pair of round shields placed side by side. Others think this fruit looks like pair of old-fashioned eyeglasses. I am an erect annual herb with the characteristic four petals, four sepals and four anthers of the mustard family. I like open, sandy soil of disturbed areas. I grow 10–12 inches (25–30 cm) tall. As I grow I keep producing flowers at the top of my stem. Descending the stem one can observe various stages of ripening seeds; the first blooming flowers are the mature seeds at the bottom of the stem.

Spectacle pod

Dithyrea wislizenii

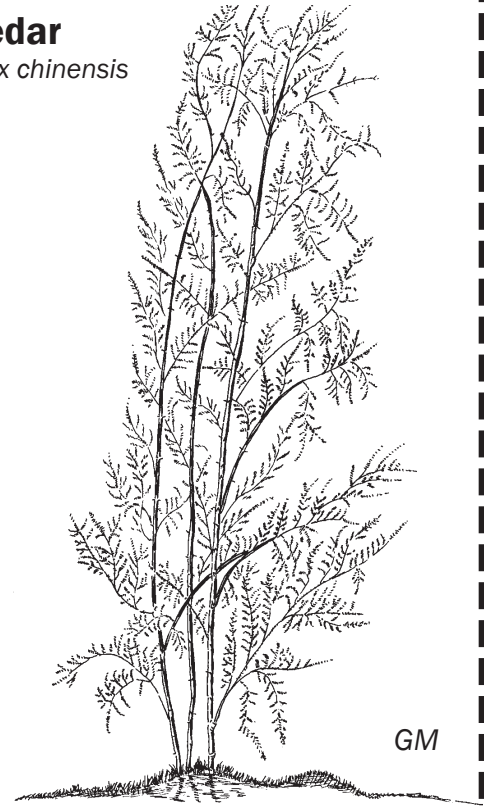


RDI

I have tiny green scale-like leaves and long narrow clusters of tiny pink blossoms. Birds and mammals use my branches for nesting and cover. Honeybees drink my nectar. I am known as a phreatophyte* or a well plant because I have deep roots that drink a lot of water from the sandy soil. Where I grow, the soil is salty. Not only can I tolerate salt, but my leaf scales concentrate salt from soil and deposit the salt on the leaf surface. Each fall my leaves turn golden orange then fall to the ground. As my leaves decompose, the soil becomes saltier. My ancestors came from southern Europe or the Mediterranean region.
*phreatophyte is pronounced "free-at-oh-fight"

Saltcedar

Tamarix chinensis



I come from China, but now I make my home in the Southwest too. My huge compound leaves grow on stout twigs, and the oily glands on my leaves have a disagreeable odor. Clusters of my small yellow-green flowers bear fruits with dry creamy-pink wings. I am a survivor that can grow in very difficult conditions, such as near sea level or in very high mountains. I send up suckers from my roots, which form a thick grove of trees. My name comes from my height that reaches to the sky.

Tree of Heaven

Ailanthus altissima



Bees love the nectar from my tiny white flowers in the summer, and in the fall and winter goldfinches eat my seeds. Introduced from Europe, I have been planted in some places to stabilize soil, but I have spread along roadsides and other disturbed areas. As a member of the legume—or pea—family, my roots can enrich the soil by fixing nitrogen. I take two years to produce flowers and seeds and can reach 2 to 6 feet (.66–2 m) tall. In my first year, I am a tiny clump of leaves. My leaves have three leaflets with serrated—or jagged—edges. In my second year of growth I send up a stalk of tiny, white flowers that produce the nectar honey producers cherish. If cattle eat too much of me they can bloat.

White Sweet Clover

Melilotus alba



I am a native of Eurasia and was brought to New Mexico to prevent soil erosion, though I am also used in landscaping. Sandy soil suits me fine. In the bosque, I sometimes grow in thick clumps of small trees, and I often have sharp thorns. The top of my lance-shaped leaf is dark blue-green and covered with tiny, soft, star-shaped hairs. So many soft hairs cover the bottom leaf surface that it is silvery white. These hairs help keep moisture in my leaves in the hot sun. Bees collect nectar from my tubular, silvery-yellow, lovely-smelling flowers. My fleshy olive-like fruit is eaten by mice, rock squirrels, grosbeaks, towhees and robins who in turn help spread my seed. Because my fruit stays on my branches long after leaves have fallen, it provides food for wildlife in the winter.

Russian Olive

Eleagnus angustifolia



My name refers to my ability to get a head start on other grasses by using winter and spring moisture to grow early in the season. While still young and tender, livestock graze my flat leaf blades, but when I mature I have nasty awns—bristle-like appendages—on my seeds. These awns stick in the animals' mouths if they eat me after I have gone to seed. The awns allow my seed to catch a ride in animal fur or people's socks to travel to a new home. When I reach maturity I dry out or "cure" and become a fire hazard. Because I like to grow in disturbed areas I can dominate an area after a fire. This creates a frequent fire cycle that favors my growth over the native grasses. I am relatively new to America but I now grow in much of the western U.S. I originally came from southern Europe and southwestern Asia.

Cheatgrass

Bromus tectorum

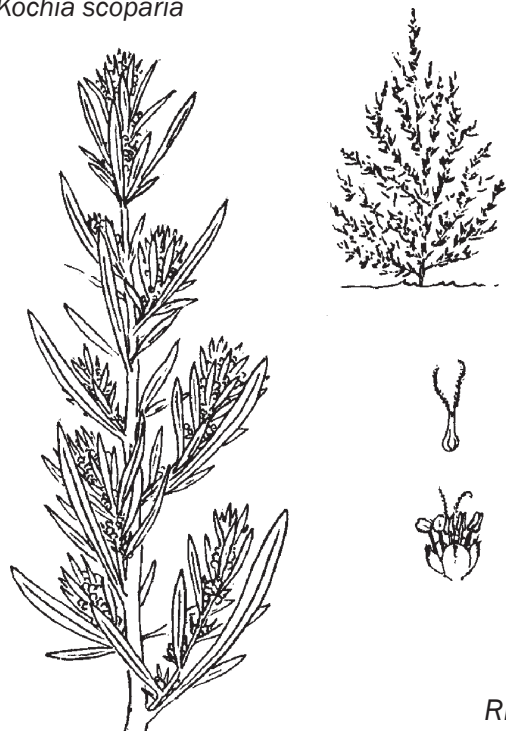


RDI

In the same growing season I spring from a small, wedge-shaped seed to a large herb reaching as high as six feet tall. My stems have many round, slender and soft hairy branches. My alternate, lance-shaped leaves have edges fringed with hair and three or five prominent veins. My tiny green flowers are so small you may not notice their dense spikes, but when they bloom, they cause allergies in lots of people. I grow in cultivated fields, gardens and waste areas in the bosque where the soil has been disturbed. Birds and mice eat my dull brown seeds. Livestock will eat my leaves, but too many causes an upset stomach. An invasive species from Asia, I have spread all through the United States.

Kochia

Kochia scoparia



RDI