Russian knapweed [*Acroptilon repens*][i]
(Common to Winters, Clarksburg and West Sac Areas)

GENERAL DESCRIPTION: Noxious **perennial** to 1 m tall, with **dark, creeping rhizomes**. Plants are aggressively competitive, facilitating **rapid colonization** and development of **dense stands**. Infestations can be extremely long-lived due to extensive root and rhizome systems. Stems dieback after flowering in summer, and new shoots are generated in spring. Introduced from Central Asia. Like yellow starthistle [*Centaurea solstitialis* L.], **Russian knapweed is toxic to horses**, causing nigropallidal encephalomalacia or "chewing disease" when sufficient quantities are consumed. Under most circumstances livestock will avoid grazing Russian knapweed because of its bitter taste.

PROPAGATION/PHENOLOGY: **Reproduces primarily by vegetative shoots from rhizomes**. Plants usually produce small quantities of viable seed. Seed heads mostly remain closed. Seeds disperse passively near the parent plant or with the seed head. Seeds germinate over a broad temperature range Seed can remain viable about 2-3 years.

Barb goatgrass [*Aegilops triuncialis* L.]
(Common to Yolo County)

GENERAL DESCRIPTION: **Winter annuals** closely related to and resembling winter wheat (*Triticum aestivum* L.). Goatgrass species hybridize with wheat and are sometimes crossed with wheat to impart adaptive characteristics such as cold tolerance and disease resistance. **Barb goatgrass** is primarily a rangeland weed. All species are introduced from Mediterranean Europe and western Asia.

- PROPAGATION/PHENOLOGY: Reproduces by seed. Dispersed by livestock, especially sheep, human activities, water (joints float), and wind.
- **barb goatgrass**: Seeds germinate in the joints in the field, but joints appear to reduce germination. Under experimental conditions, seed germination in the joints was about 41%. Removing seed from joints increased germination to about 91%. Germination occurs under a wide range of temperatures (less than 5º C and greater than 25º C). Some seeds can remain dormant for 2 or more years. Seedling growth is fastest at about 5-10º C

Smooth distaff thistle [*Carthamus baeticus]*
(Only Known infestation is on Tompkins Ranch, Capay Valley)

SYNONYMS: **smooth distaff thistle:** *Kentrophyllum baeticus* Boiss. & Reuter; *Carthamus nitidus*, California references, not Boiss.; *Carthamus lanatus* L. ssp. *baeticus* (Boiss. & Reuter) Nyman.

GENERAL DESCRIPTION: **Noxious winter annual** composite weeds, with **rigidly erect** branched stems to 1 m tall. Plants exist as rosettes until spiny-leaved flowering stems are produced in spring/summer. Plants are highly competitive with cereal crops and desirable rangeland species. Because of their spiny nature, distaff thistles can injure the eyes and mouths of livestock forced to graze within dense populations of the weeds. Distaff thistles are closely related to commercial safflower. Introduced from the Mediterranean region.

PROPAGATION/PHENOLOGY: **Reproduces by seeds; smooth distaff thistle:** Most seeds (achenes) disperse passively near the parent plant, but some remain in the persistent seed heads. Seed heads can disperse by animals or machinery. Most seeds germinate after the first fall rains 1-3 years following maturation, but some seed can remain dormant and viable for up to 8 years under field conditions. Germination of seeds at locations with low rainfall and temperatures can be slow and drawn out. Typically, few seeds germinate after midwinter. Seedlings rarely emerge from soil depths below 5 cm. Optimal emergence occurs at or just below the soil surface. Seeds are susceptible to predation by termites.

Purple starthistle [*Centaurea calcitrapa* L.] **(Winters Area)**
Iberian starthistle [*Centaurea iberica* Spreng.]
(**Only known infestation at the Glide Ranch, S. Davis)**

SYNONYMS: **Purple starthistle: Annual to perennial**, to 1 m tall. Introduced from southern Europe. **Iberian starthistle: Annual, biennial, or short-lived perennial**, to 1 m tall. Closely resembles **purple starthistle**. Introduced from southeast Eurasia.

GENERAL DESCRIPTION: **Noxious bushy weeds** with **spiny** or **comb-like phyllaries** and **white, pink, or purple flowers**. Plants exist as basal rosettes until erect, highly branched flowering stems with are produced late spring/summer. *Centaurea* species produce allelopathic effects and are highly competitive with other plants, often displacing desired vegetation. *Centaurea* is a large genus comprised of about 500 species, none native to California. Thirteen species occur in California as introduced weeds and escaped ornamentals.

PROPAGATION/PHENOLOGY: **Reproduces by seeds**, except where noted. These species have variable dispersal mechanisms described below. However, most seeds or seed heads of all *Centaurea* species fall near the parent plant, and some can disperse to greater distances with human activities, vehicles, heavy machinery, water, soil movement, and by clinging to shoes, clothing, tires, and feet, fur, or feathers of animals. Germination can occur over a broad range of environmental conditions. Seedling emergence is typically highest after the first fall rains. Most seedlings emerge from seeds at or near the soil surface. Plants produce fewer viable seeds in dry years.
Purple starthistle: Seeds disperse with the seed head as a unit. Most seed germinates the first year, but buried seed can remain dormant for about 3 years. **Iberian starthistle:** No information available, but likely to be similar to **purple starthistle**

IBERIAN STARTHISTLE

Yellow starthistle [*Centaurea solstitialis* L]
(Common to Yolo County)

GENERAL DESCRIPTION: Noxious erect **winter annuals** (sometimes biennials) with **spiny yellow-flowered heads**, mostly to 1 m tall.

Yellow starthistle: Annual, sometimes biennial, to 2 m tall. Plants are highly competitive and typically develop dense, impenetrable stands that displace desirable vegetation in natural areas, rangelands, and other places. Seeds often contaminate grains, lowering the value and quality of harvests. **Yellow starthistle** contains an unidentified compound that causes nigropallidal encephalomalacia or chewing disease in horses. The compound only affects horses and permanently damages the area of the brain that controls fine motor movements, including mouth and lip movements. Toxicity effects are cumulative. Horses must consume a 50-150% of an animal's weight in dry-weight plant material over a period of 1 to 3 months to produce symptoms. Because of its bitter taste, horses usually avoid grazing **yellow starthistle**. However, the disease can occur when horses are allowed to graze infested pastures, especially those that lack adequate amounts of suitable green forage, or are fed contaminated hay over a period of time. Once the toxicity threshold has been reached, symptoms occur rapidly. Symptoms include fatigue, lowered head, an uncontrolled rapid twitching of the lower lip, tongue-flicking, involuntary chewing movements, and an unnatural open position of the mouth. Without intervention, affected horses are unable to eat or drink and eventually die from starvation or dehydration. **Yellow starthistle** was introduced from Southern Europe.

PROPAGATION/PHENOLOGY: **Reproduce by seed**. Seeds fall near the parent plant or are dispersed to short distances with wind and to greater distances with human activities, animals, water, and soil movement. Most seeds germinate after the first fall rains. Plants exist as basal rosettes through winter and early spring until flowering stems develop in late spring or early summer.

- **Yellow starthistle:** Seed heads typically contain ~ 30-80 seeds. Seed head production is highly variable (1- 1000 heads per plant) and depends on a variety of factors, including soil moisture and competition. Large plants can produce nearly 75,000 seeds. Some seed is viable 8 days after flower initiation. Most seed does not appear to require an afterripening period. Seed germination is closely correlated with rainfall events. Large flushes of seed germinate after the first fall rains, but smaller germination flushes can occur nearly year round. Non-pappus bearing seeds appear to require higher temperatures to germinate than pappus bearing seeds. Light is required for seed germination. Seed can survive for up to 10 years in the field, depending on environmental conditions, but it appears that few seeds survive beyond 2-3 years in the Central Valley. Shaded conditions reduce flower production and root growth. In some areas, flowering plants may be found year-round in areas not exposed to severe frost.

Rush skeletonweed or **Skeletonweed** [*Chondrilla juncea* L.]
(Only known infestation is on River Road by the monument)

- SYNONYMS: Skeleton weed; naked weed; gum succory; devil's-grass; hog bite.

GENERAL DESCRIPTION: Herbaceous **perennial** or biennial, with **rigid, wiry flowering stems** to 1 m tall, **milky sap**. Plants exist as basal rosettes until flowering stems develop at maturity and rosette leaves whither. Persistent flower stems can hinder harvest machinery. Several forms (biotypes) occur, differing in leaf width, branching pattern, and flowering time. Characteristics can vary between, but rarely within populations since all reproduction is by clones (vegetative and seed apomixis). Plants are highly competitive for water and nutrients.

PROPAGATION/PHENOLOGY: Triploid. **Reproduces only by clones produced vegetatively from adventitious buds on roots** and **asexually by apomictic seed**. Seeds primarily disperse with wind, but also by water, animals, and human activity. Seeds can be highly viable, with ~90% germination the first year and are short-lived under field conditions, to ~2% the third year but often less than 6 months. Seeds lack dormancy and can germinate within 24 hours under optimal conditions. Fresh seeds germinate without light and at a temperature range of 7-40 ºC (optimum 15-30 ºC). Seed germination and new bud growth begin in fall after first rains in mild winter areas or early spring in colder climates. Seedling emergence is reduced in water saturated or heavy clay soils and during drought conditions. First year plants on deep sandy soil can produce viable seed earlier. Can develop from rosette to seed maturity in 1 month. Flowering stems are produced in early summer. One plant can produce 15,000-20,000 seeds per season.

Field bindweed [*Convolvulus arvensis* L.]
(Common to Yolo County)

SYNONYMS: small bindweed, field morning-glory, small-flowered morning glory, wild morningglory, European morningglory, orchard morningglory, creeping jenny, creeping charlie, cornbind, greenvine, lovevine

GENERAL DESCRIPTION: **Viny perennial** with an **extensive system of deep creeping roots and rhizomes**. **Field bindweed** is considered one of the most **noxious** weeds of agricultural fields throughout temperate regions of the world. Plants typically develop large patches and are difficult to control. It is troublesome in numerous crops, but is especially problematic in cereals, beans, and potatoes. Heavy infestations in cereal crops can reduce harvest yields 30-40% or more. Foliage contains tropane alkaloids and can cause intestinal problems in horses grazing on heavily infested pastures. Introduced from Europe.

PROPAGATION/PHENOLOGY: **Reproduces by seed and vegetatively from deep creeping roots and rhizomes**. Most seeds fall near the parent plant, but some seeds may disperse to greater distances with water, agricultural activities, and animals. Seeds are hard coated and can survive ingestion by birds and other animals. Most seeds can imbibe water and germinate 10-15 days after pollination. However, seed coats mature 15-30 days after pollination, and ~ 80% of seeds become impermeable to water. Impermeable seeds require scarification or degradation of the seed coat by microbial action to imbibe water and germinate. Seeds germinate throughout the growing season, but peak germination usually occurs mid-spring through early summer. Under field conditions, seed can survive for 20 years or more. A high percent of seed under dry storage can survive for at least 50 years. Seed production is highly variable. Dry, sunny conditions and calcareous soils favor seed production. Frequent cultivation, rain, or heavy, wet soils can inhibit seed set. One plant can produce up to 500 seeds. In the field, young plants seldom produce seed the first season. Root starch reserves are highest from mid-summer through early fall, but then decline rapidly with conversion to sugars. Root carbohydrates are lowest in mid-spring before flowers develop. Maximum translocation of carbohydrates from shoots to roots occurs from the bud to full flower stages. Most new shoots appear in early spring. Undisturbed patches can expand their radius up to 10 m per year. Root fragments as small as 5 cm can generate new shoots.

Dodder [*Cuscuta* spp.]
(Common to Yolo County)

SYNONYMS: angel's hair, witch's hair, tangle gut, strangle gut, devil's gut, love vine, witch's shoelaces.

GENERAL DESCRIPTION: **Annual stem parasites** with leafless, thread-like, **orange, red,** or **yellow** stems that twine over other plants. Dodder can be problematic in agricultural crops, especially alfalfa and tomatoes. In addition, dodder seed is difficult to exclude from commercial alfalfa, clover, or flax seed.

- **Dodder:** In California, 8 of the 9 species are native, and several are uncommon. Native species usually grow on various herbs and shrubs in most natural communities and are **not** considered weeds under these conditions. In agricultural fields, field dodder [*C. pentagona* Engelm.], large-seeded dodder [*C. indecora* Choisy], and California dodder [*C. californica* Hook. & Arn.] are most common, respectively.

PROPAGATION/PHENOLOGY: **Reproduces by seed and vegetatively**. Broken stems can develop new haustoria. Seed disperses by water, animal ingestion and movement, and especially human activities and machinery. A proportion of seed has a hard coat that must be weakened by scarification, microbial decomposition, and winter chilling before germination can occur. Germination does not require the presence of a host plant. Under favorable conditions, seed can germinate in the fruits. Seed can remain viable for at least 10 years in the soil. Emergence is typically from the top 5 cm of soil. In most years, the period of emergence ends by mid-May in the Central Valley.

Bermudagrass [*Cynodon dactylon* (L.)
(Common to Yolo County)

SYNONYMS: couch grass, devil's grass, dog's tooth grass, wire grass, scutch grass, common quickgrass, *Panicum dactylon* L., *Paspalum dactylon* (L.) Lam., *Milium dactylon* (L.) Moench, *Fibichia dactylon* (L.) Beck, *Digitaria dactylon* (L.) Scop., *Chloris cynodon* Trin., *Capriola dactylon* (L.) Kuntze

GENERAL DESCRIPTION: Highly variable sod-forming **perennial** with **extensive creeping rhizomes** and **stolons**, to 0.4 m tall. **Bermudagrass** is commonly grown as durable turf or forage in tropical to warm temperate regions nearly worldwide. Numerous hybrids and cultivars have been developed, including some that tolerate cooler conditions. Because of its vigorous creeping habit, **bermudagrass** is a noxious weed in many situations where warm season moisture is ample. Contact with plants can cause dermatitis in sensitive individuals, and the pollen is a common allergen. Mature **bermudagrass** pastures have occasionally been implicated in livestock photosensitization or neurological syndromes, especially in late fall or early winter. **Toxic** symptoms may be due to molds or fungi sometimes associated with **bermudagrass**. Introduced from Africa.

PROPAGATION/PHENOLOGY: **Reproduces vegetatively from creeping rhizomes** and **stolons** and **by seed**. Rhizome and stolon fragments disperse with landscaping and agricultural activities, and soil movement. Re-growth from fragments is greatest from soil depths to 5 cm (2 in). Seeds disperse with water, soil movement, agricultural and landscape machinery, as a commercial seed impurity, in livestock feeds and bedding, and with other human activities. Seeds germinate spring through fall when temperature and moisture conditions are favorable. Some seeds survive up to ~ 3-4 years under field conditions.

Yellow nutsedge [*Cyperus esculentus*]
Purple nutsedge [*Cyperus rotundus* L.]
(Common to Yolo County)

SYNONYMS:

- **yellow nutsedge:** yellow or northern nutgrass, chufa, earth almond, rush nut, edible galingale, watergrass
- **purple nutsedge:** coco sedge, coco-grass, purple nutgrass

GENERAL DESCRIPTION: **Perennials** with grass-like leaves, **triangular stems**, and **rhizomes with small tubers** attached. Both species are among the most **noxious** of agricultural weeds in temperate to tropical regions worldwide. They often form dense colonies, can greatly reduce crop yields, and are difficult to control. In California, nutsedges are especially troublesome in annual and perennial crops that receive summer irrigation. Elsewhere **yellow nutsedge** is grown for its edible, earthy almond-flavored tubers. **Purple nutsedge** tubers taste bitter and are used medicinally in China and India. **Yellow nutsedge** is a widespread, highly variable native of North America and Eurasia. **Purple nutsedge** is introduced from Eurasia and is often called the "world's worst weed."

PROPAGATION/PHENOLOGY: Reproduce **vegetatively from tubers and by seed**. Tubers and seeds disperse with agricultural and nursery activities, soil movement, and in water, especially flooding. Seeds also disperse with wind. Seeds and tubers germinate in spring. Tubers develop to soil depths of ~ 32 cm, but most are in the top 20 cm. One plant can produce hundreds to thousands of tubers in one season. Seed production can be high, but viability is variable. In California, seed viability is typically low. One plant can develop into a dense colony 3 m (10 ft) or more in diameter. Patch boundaries can increase by more than 1 m per year.

- **yellow nutsedge:** Tubers planted to soil depths of 80 cm produced new plants. Tubers survive soil temperatures as cold as 20º F (-5º C) and require a period of chilling to break dormancy and germinate. Tubers germinate when soil temperatures remain above 43º F (6º C). Under field conditions, tubers typically survive up to ~ 3-4 years.

- **purple nutsedge:** Tubers tolerate high temperatures, but not freezing. Tubers germinate when soil temperatures remain above 59º F (15º C). Typically only 1 tuber in a chain germinates, unless the chain is severed. Low oxygen and high carbon dioxide levels appear to promote tuber dormancy. Tuber dormancy is high in undisturbed soils and at deeper soil levels. Tubers can remain dormant for long periods and can become dormant after sprouting. Tuber dormancy often increases with age. New tubers are initiated when flowers develop, often ~ 4-8 weeks after shoots emerge. Tubers planted at a depth of 90 cm are usually unable to produce aerial shoots. Tubers desiccate quickly when detached from the rhizome-root system under dry conditions and can survive flooded soils for at least 200 days. Tuber longevity is variable and depends on environmental conditions. In most cases, tubers survive about 3-4 years, but under certain conditions they can remain viable for up to 10 years or more. Seedling survival is typically low. Plants utilize the C4 photosynthetic pathway and appear to have allelopathic properties

Common St. Johnswort or **Klamathweed** [*Hypericum perforatum* L.]
(Only known infestation is on South River Rd)

SYNONYMS: klamathweed, goatweed, tipton weed, St. Johnswort

GENERAL DESCRIPTION: Erect **noxious perennial**, to 1.2 m tall, with **rhizomes** and **showy, bright yellow flowers**. Foliage is **dotted with tiny translucent** and **black oil glands** that contain hypericin, a fluorescent red pigment that is **toxic** to livestock when consumed in quantity, especially to animals with light-colored skin. Toxicity symptoms include skin photosensitivity of light-colored areas and loss of condition. Most animals graze plants only when more desirable forage is unavailable. In herbal medicine, hypericin is the antidepressant ingredient in St. Johnswort remedies. There are several regional varieties of **common St. Johnswort**. The variety in the Pacific Northwest is aggressively competitive and can spread rapidly by seed and rhizomes. By 1940, more than 2 million hectares (~ 1 million ha in California) of rangelands were infested. Several years later, the leaf-feeding flea beetles *Chrysolina quadrigemina* and *C. hyperici* and the root-boring beetle *Agrilus hyperici* were successfully introduced as biocontrol agents. Today infestations of the weed have been reduced by 97 to 99 %. Localized outbreaks of the plant sometimes occur after disturbances such as logging, fire, or during low population cycles of the flea and root-boring beetles. Introduced from Europe where it has been used medicinally for centuries.

PROPAGATION/PHENOLOGY: **Reproduces by seed** and **vegetatively from rhizomes**. Plants can develop seed with or without pollination (facultative apomixis). Seed and capsules disperse with water and adhere to machinery, tires, shoes, clothing, and feet, fur, or feathers of animals. Seeds are hard-coated, and those consumed by animals remain intact and viable. Seeds from plants in the Pacific Northwest usually do not require an after-ripening period. Germination occurs fall through spring. Brief exposure to fire (100-140º C, 212-284º F) often increases germination. Seed can remain viable for ~10 years or more in the soil and for at least 5 years submerged in fresh water. Plants typically produce an average of 15,000-33,000 seeds per plant. Seedlings survive best on disturbed open sites.

Perennial peppergrass or **Tall whitetop** or **Perennial pepperweed** [*Lepidium latifolium* L.]
(Common to Yolo County)

SYNONYMS: perennial peppergrass or peppercress, slender perennial peppercress, broadleaved or broadleaf pepperweed, tall whitetop, giant white weed, iron weed, *Cardaria latifolia* (L.) Spach

GENERAL DESCRIPTION: **Erect noxious perennial** to 2 m tall, with white flowers and extensively **creeping roots**. Plants are highly competitive and typically form **dense colonies** that displace native vegetation and wildlife. Toxicity to grazing livestock is undocumented. Goats appear to tolerate heavy consumption of fresh plants. However, there have been reports of horses becoming ill after being fed contaminated hay. **Perennial pepperweed** has spread rapidly throughout the western U.S. since its introduction from Eurasia around 1936. Outside of California, it is a major problem in Nevada.

PROPAGATION/PHENOLOGY: **Reproduces vegetatively from creeping roots** and **root fragments** and **by seed**. Roots do not hold soil together very well, allowing erosion of river, stream, or ditch banks. Root fragments and seeds float and disperse with flooding, soil movement, and agricultural and other human activities. Seeds can also cling to tires, shoes, and the feet, fur, and feathers of animals and contaminate hay or crop and pasture seed. Large fragments can survive extreme desiccation on the soil surface for extended periods. Fragments as small as 1-2 cm long and 2-8 mm in diameter can develop into new plants. New shoots begin to grow from roots in late winter. Fluctuating temperatures appear to stimulate seed germination. Plants usually produce abundant, often highly viable seed, but seedlings are seldom detected in the field. In wet years, seed production is sometimes limited by white rust (*Albugo* sp.) infection. Seedlings emerge mid-winter through mid-spring.

Purple loosestrife [*Lythrum salicaria* L.]
(Found in areas along Cache Creek)

SYNONYMS: **purple loosestrife:** purple lythrum, bouquet-violet, *Lythrum salicaria* vars. *gracilior* Turcz., *tomentosum* (P. Mill) DC., *vulgare* DC.

GENERAL DESCRIPTION: **purple loosestrife:** Erect **perennial** with **showy pinkish-purple flower spikes**, to 2(3) m tall. A mature plant can develop into a large clump up to 1.5 m in diameter. Above ground foliage usually dies during the cool season, and new shoots sprout from a broad woody crown in spring. Originally cultivated as an ornamental and medicinal herb, **purple loosestrife** has escaped cultivation and become a **noxious** weed of wetlands in many regions throughout temperate North America. Plants often form dense colonies that displace native vegetation and wildlife. Introduced from Eurasia..

PROPAGATION/PHENOLOGY: **Reproduce primarily by seed**. Stem fragments can develop roots under favorable conditions. Seeds disperse with water, mud, human activities, and by clinging to feathers, fur, and feet of animals.

- **purple loosestrife:** A large plant can produce more than 2 million viable seeds in one season. Most seeds sink in water. Seeds typically germinate mid-spring through early summer. Upon germination, seedlings float to the surface. Optimal temperature range for germination is between 15-20º C. Light appears to increase germination. Seeds under cold dry storage remain highly viable for at least 3 years, but longevity under field conditions is unknown. Seedlings can mature and flower within 8-10

Alkali Mallow [*Malvella leprosa*]
(Common to Yolo County)

SYNONYMS: alkali mallow, ivy-leaf sida, creeping mallow, dollar weed, white mallow, star mallow, whiteweed, *Sida hederacea* (Dougl.) Torr. or Torr. ex A. Gray, *Sida leprosa* (Ortega) K.Schum. var. *hederacea* (Douglas ex Hook.) K.Schum., *Sida obliqua* Torr. & Gray, *Malva hederacea* Dougl. ex Hook

GENERAL DESCRIPTION: **Low-growing perennial**, to 0.4 m tall, with **deep, creeping roots**. **Alkali sida** is a widespread native of the Western U.S. and is usually a desirable component of natural communities. Plants typically form colonies, especially in disturbed places. Extensive colonies can be troublesome in agronomic crops, orchards, and pastures. **Alkali sida** can be **toxic** to sheep (and possibly other livestock) when consumed in quantity by forming hairball blockages in the intestines. However, animals usually avoid grazing i

PROPAGATION/PHENOLOGY: **Reproduces by seed** and **vegetatively from creeping roots**. Seed germinates in spring. Seedlings grow rapidly and flower the first year. Foliage dies back in fall, and new shoots emerge from roots in spring. Water can effectively disperse seed.

Kikuyugrass [*Pennisetum clandestinum*]

SYNONYMS: **kikuyugrass:** *Pennisetum longistylum* Hochst., *Pennisetum longistylum* var. *clandestinum* (Hochst. ex Chiov.) Leeke, *Pennisetum inclusum* Pilg.

GENERAL DESCRIPTION: Warm climate **perennials** that have escaped cultivation in mild coastal to warm arid areas of California. **Kikuyugrass** was originally planted in California as an erosion-controlling ground cover.

- **kikuyugrass:** Tough **low-growing perennial** to 0.5 m tall, with **inconspicuous flower heads** and an **extensive network** of **coarse creeping stolons** and **rhizomes**. **Kikuyugrass** can be **noxious** in many agricultural and landscape situations. It is a good forage grass for livestock and is utilized for pasture in Australia and many other countries. Several cultivars have been developed for use as turf or pasture. However, under certain conditions **kikuyugrass** can accumulate high levels of nitrates and soluble oxalates that are **toxic** to livestock when ingested. Introduced from tropical Africa.

PROPAGATION/PHENOLOGY: Apomictic (asexual reproduction where embryos develop without fertilization) and to a smaller degree, out-crossing. Pollination is required for apomictic seed development. Most seeds germinate late spring through early summer. All are +/- winter dormant.

- **kikuyugrass: Reproduces vegetatively by creeping rhizomes** and **stolons** and to a lesser extent, by seed. Rhizome and stolon fragments and seeds disperse with landscape maintenance and agricultural machinery, hand tools, soil movement, water, and other human activities. Seed producing types reproduce normally. Varieties that typically do not develop seed are unable to produce fertile pollen, but can develop viable seed (apomictic and sexual) if pollinated by fertile varieties. Optimal soil temperature for seed germination is between 18-30º C (65-86º F). Seeds may be long-lived under field conditions and can survive ingestion by sheep. Seedlings typically emerge from soil depths up to ~ 6 cm (2.25 in).

Russian thistle or **Common Russian thistle** [*Salsola tragus* L.]
(Common to Yolo County)

- **Russian thistle:** tumbleweed, Russian tumbleweed, tumbling weed, windwitch, witchweed, common saltwort, *Salsola australis* R.Br., *Salsola iberica* (Sennen & Pau) Botsch, *Salsola kali* L. var. *tenuifolia* Tausch., *Salsola kali* L. ssp. *tragus* (L.) Celakovsky, *Salsola kali* L. ssp. *ruthenica* (Iljin) Soo, *Salsola pestifer* Nelson.

GENERAL DESCRIPTION: Noxious **bushy summer annuals**, with rigid branches and reduced, stiff, prickly upper stem leaves (bracts) at maturity. Introduced from Eurasia.

- **Russian thistle:** Plants are an alternate host for the beet leafhopper (*Circulifer tenellus*) that can carry the virus causing curly-top of sugarbeets, tomatoes, melons, and many other crop and native plants. Immature plants can provide extra forage for livestock on arid rangelands. However, under certain conditions, such as heavy nitrogen fertilizer application, nitrates or oxalates can accumulate to levels poisonous to sheep. Biocontrol has not been successful in California. **Russian thistle** consists of 2 variants or types in California. Currently designated type A and type B, the two types differ in chromosome number (A: 2n = 36; B: 2n = 18), spinyness, fruit size, calyx characteristics, seed weight, and pubescence. Both types hybridize with **barbwire Russian thistle**. Plants with intermediate characteristics can be found in regions where both species occur. Introduced into South Dakota around 1874 in flax seed from Russia.

PROPAGATION/PHENOLOGY: **Reproduce by seed**. Seed appears to require an after-ripening period. Cotyledons are photosynthetic upon emergence.

- **Russian thistle:** Most seed germinates in the spring following maturation. Seed can germinate when night temperatures are below freezing and daytime temperatures reach 2º C. Optimal temperatures for germination are between 7 and 35º C (45 and 95º F). **Germination requires little moisture (0.3 inches of rainfall) and occurs within in a few hours.** Successful germination requires loose soils. Seedlings that germinate on firm soil seldom survive because radicles are unable to penetrate the soil. Seed in the field typically remains viable for only 1 year, some up to 2 years, rarely to 3. Plants about 0.5 m tall can produce about 1500-2000 seeds, and large plants can produce up to 100,000. Seed disperses when plants break off at ground level and tumble with the wind. Seedlings attain optimal emergence from litter or soil depths to 1 cm, but can emerge from soil depths to 6 cm

Silverleaf nightshade or **White horsenettle** [*Solanum eleagnifolium* Cav.]
(Common to Yolo County)

SYNONYMS: **silverleaf nightshade:** silverleaf nettle, white horsenettle, silverleaf bitter apple, tomato weed, white weed, trompilla, melloncillo, desert nightshade, prairie berry

GENERAL DESCRIPTION: **Noxious perennial herbs to shrubs,** usually with **creeping roots** and **prickles on the stems** (may be sparse or lacking on **robust horsenettle**, **silverleaf nightshade**, and **lanceleaf nightshade)**. Foliage is **covered with star-shaped hairs**. Foliage, flowers, and fruits are variable and often similar among species. Star-shaped hair characteristics (visible with 20x magnification) can help with species identification. Foliage and berries of this nightshade group contain variable amounts of several glycoalkaloids and can be **toxic when ingested** by livestock or people. Dried plant material does not lose its toxicity. In **horsenettle**, toxic compounds are most concentrated in fall. Acute toxicity symptoms include gastrointestinal irritation and nervous effects such as apathy, drowsiness, salivation, trembling, breathing difficulties, progressive weakness, paralysis, and unconsciousness. Symptoms of chronic poisoning in cattle by **horsenettle** include appetite loss, emaciation, rough coat, constipation, and a form of dropsy (ascites). Poisoning may or may not result in death. Sheep and goats are more resistant to poisoning than cattle or horses. Ironically, berries are consumed by many species of birds and small mammals. Fruits of **silverleaf nightshade** and **white-margined nightshade** also contain solasodine, a steroid compound used commercially to synthesize steroid hormones. **Horsenettle**, **silverleaf nightshade**, and **robust horsenettle** can be troublesome in agricultural fields and pastures, especially those receiving summer irrigation. Large infestations can reduce harvest yields of crops and the carrying capacities of pastures by competing with desirable plants for nutrients and soil moisture.

PROPAGATION/PHENOLOGY: **All reproduce by seed** and **vegetatively from creeping roots** (except possibly **white-margined nightshade**). Fruits and seeds disperse with agricultural activities, water, mud and soil movement, and animals. Root fragments disperse primarily with cultivation or other human activities. In winter, roots of **horsenettle**, **robust horsenettle**, and **silverleaf nightshade** go dormant and foliage dies back. Roots generate new shoots in spring. Seeds germinate spring through summer. **silverleaf nightshade:** Berries mature in 4-8 weeks. Each berry contains ~ 75 seeds. Seeds are typically highly viable, but germination is often sporadic from year to year. Seed ingested by animals often survives and is more likely to germinate. Under favorable conditions, seed germination percentages can be high (~ 80 %). Seed can remain viable for at least 10 years.

Johnsongrass [*Sorghum halepense* (L.)
(Common to Yolo County)

SYNONYMS: **Johnsongrass:** Aleppo grass, meansgrass, maiden cane, Egyptian millet, evergreen millet, false Guinea grass, Cuba grass, Syria grass, St. Mary's grass, *Sorghum arundinaceum* (Desv.) Stapf, *Sorghum miliaceum* (Roxb.) Snowden, *Andropogon halepensis* (L.) Brot., *Holcus halepensis*

GENERAL DESCRIPTION: **Coarse grasses** with reddish to purplish-black panicles, to **2 m tall**. These grasses are cultivated for food and/or forage, but have escaped cultivation and become troublesome agricultural weeds in temperate to tropical regions throughout the world. **Johnsongrass** and **shattercane** grow rapidly, are highly competitive with crops, and can be difficult to control. Infestations in crops can reduce harvest yields significantly. Both species hybridize with each other and with cultivated sorghum varieties, diminishing the quality and value of grain harvested for seed. Plants are highly variable and many regional biotypes exist.

Johnsongrass: Perennial with vigorous rhizomes. Plants can rapidly develop colonies. **Johnsongrass** is considered one of the 10 most **noxious** weeds in the world. It is especially troublesome in cotton fields in California. Introduced as a forage crop from the Mediterranean

PROPAGATION/PHENOLOGY: Panicles retain seed or shed seed near the parent plant (shatter). Seed disperses to greater distances with wind, water, agricultural activities, and animals. Some seed survives ingestion by birds and mammals. Unlike commercial sorghums, glumes tightly enclose seeds and can protect seeds from decomposition in the soil for several years.

- **Johnsongrass: Reproduces by seed** and **vegetatively from rhizomes**. Most seed requires an average after ripening period of 4-5 months. It has been estimated that some seed may remain viable for up to 15 years. In California, seed germination can occur from early spring through early fall. Optimum germination temperature is ~ 24º C (75º F). Rhizome production increases up to 32º C (90º F) and then rapidly declines. New shoots from rhizomes resemble seedlings and typically appear early in the growing season. Seedlings and new shoots begin to develop rhizomes 3-6 weeks after emergence. Maximum rhizome growth occurs during the flowering period, which usually begins 6-9 weeks after emergence and continues until fall. One plant can produce up to 90 m (295 ft) of rhizomes in a single season. Rhizomes grow mostly in the top 30 cm of soil, but can grow to 120 cm deep in cultivated soils. Most rhizomes live ~ 1 year. Rhizome carbohydrate reserves are lowest ~10-30 days after shoot emergence and highest during flowering. Shoots can emerge from rhizomes up to 30 cm (11 in) deep, but maximum shoot emergence is from rhizomes 5 cm (2 in) deep or less. Rhizomes of some biotypes tolerate more than 4 weeks of flooding at temperatures up to 20ºC (68º F). Others are killed by 2 ½ weeks of flooding at 30º C (86º F). Fragments as small as 2.5 cm can produce new plants from depths to ~10 cm. Optimal plant growth occurs with light intensities of 30-40% of full daylight for 16 hrs. Growth is inhibited when light intensity is 20% or less of full daylight. Rhizome and seed production is often delayed in dense colonies.

Medusahead [*Taeniatherum caput-medusae* (L.)
(Common to Yolo County)

SYNONYMS: *Elymus caput-medusae* L., *Hordeum caput-medusae* (L.) Crosson & Durand, *Cuviera caput-medusae* (L.) Simk., *Taeniatherum asperum* (Simonk.) Nevski, *Taeniatherum caput-medusae* (L.) Nevski ssp. *asperum* (Simk.) Melderis, *Taeniatherum crinitum* (Schreb.) Nevski var. *caput-medusae* (L.) Wipff, and many others.

GENERAL DESCRIPTION: **Noxious winter annual** to 0.6 m tall. **Medusahead** typically invades rangeland communities. Dense stands often develop, displacing desirable vegetation and wildlife, and lowering the livestock carrying capacity. Relative to other forage species, **medusahead** contains much silica, making it harsh and unpalatable to livestock except during the early growth stages. The stiff awns and hard florets can injure eyes and mouths of grazing animals. Seed-eating birds usually avoid feeding on the seeds. Senesced plants form a dense layer of litter that decomposes slowly, changing the temperature and moisture dynamics of the soil, greatly reducing seed germination of other species, and creating more fuel for wildfires. **Medusahead matures 2-4 weeks later in the season than most other annual grasses** The **yellowish-green sheen** of dense stands is highly visible after other annual grasses turn brown. Introduced from Europe.

PROPAGATION/PHENOLOGY: **Reproduces by seed**. Seed production is prolific. Seeds disperse locally with wind and water and to greater distances with soil movement, human activities, and by clinging to the feet and fur of animals. Newly matured seeds require a cool after-ripening period of ~ 3-4 months and contain a germination inhibitor in the awns that must degrade before germination can occur. Germination is typically rapid and occurs under a broad temperature range (optimal 10-15º C). Most seeds germinate in fall after the first rain, but some seeds remain dormant or germinate in winter or spring. Seeds can germinate in dense litter under low moisture conditions and without directly contacting a moist substrate. Nitrogen can stimulate some dormant seeds to germinate. Seedlings emerge from soil depths up to ~ 8 cm (3-4 in).

Puncturevine [*Tribulus terrestris* L.]
(Common to Yolo County)

SYNONYMS: caltrop, tackweed, ground burnut, puncture weed, bullhead, goathead, Mexican sandbur

GENERAL DESCRIPTION: **Noxious summer annual,** with **prostrate** stems up to 2.4 m long. Plants produce many stout-spined burrs that can injure people and animals and puncture bicycle tires. Foliage is **toxic** to livestock, especially sheep, when consumed in quantity. Fruits are used medicinally in India. Introduced from the Mediterranean region. Once one of California's most troublesome weeds, **puncturevine** is currently controlled by the stem weevil (*Microlarinus lypriformis*) and seed weevil (*M. lareynii*), introduced from Italy as biocontrol agents in 1961.

PROPAGATION/PHENOLOGY: **Reproduces by seed**. Nutlets disperse by adhering to tires, shoes and clothing of people, fur, feathers, and feet of animals. Most newly matured seeds are dormant and require an after ripening period of ~ 6 months to 1 year. Germination requires warm temperatures. The largest seed in a nutlet is usually the first to germinate. Other seeds may germinate or remain dormant depending on moisture availability. Buried seed can remain viable for several years. Seedlings emerge early spring through summer, often in flushes following increased soil moisture. On sandy soils, seedlings emerge from depths to ~ 5 cm (less on heavy soils). Seedlings develop a deep root system in a few weeks, and flowers may be produced within 3 weeks, burrs within 6 weeks. Plants typically bear numerous burrs (average 200-5000) until the cool season commences. In tropical regions, plants develop woody roots and become perennial.

Italian thistle [*C. pycnocephalus* L.]
(Common to Yolo County)

SYNONYMS: **Italian thistle:** slender thistle, Plymouth thistle

GENERAL DESCRIPTION: Erect thistles with **prickly winged stems** and leaves. Plants exist as basal rosettes until flowering shoots develop at maturity
Italian and **slenderflowered thistle:** Winter annuals (or biennials) to 2 m tall

PROPAGATION/PHENOLOGY: **Reproduces by seed**. Seeds fall near the parent plant or disperse by wind, water, birds, small mammals, and human activities.

Italian and slenderflowered thistle: Plants do not require a period of chilling to induce flowering. Flowering is continuous until soil moisture is depleted. Seeds are highly viable and germinate under a wide range of temperature regimes. High temperatures such as those that typically occur in late summer inhibit germination. Seedlings can emerge from soil depths of 8 cm, but depths of 0.5-2 cm appear optimal. Seeds beneath about 1 cm of litter or soil germinate better that those on top of litter or soil. Seed germination on the surface of clay soils is greater than on other soil or litter surfaces. Central seeds are mostly wind or gravity dispersed and apparently lack an after ripening period. Seed coats contain germination inhibitors that can leach out within 2 days in the presence of adequate water. Evidence suggests that the mucilaginous coating can act as an adhesive for seed transport and that it increases water retention of seeds, improving germination on the surface of clay soils. On average, flower heads produce about 11 central seeds and 2-3 outer seeds. Outer seeds remain with the flower head and typically germinate in the head after it falls to the ground. Outer seeds are variably dormant and persist in the soil for up to ~ 7 years.

Hoary Cress

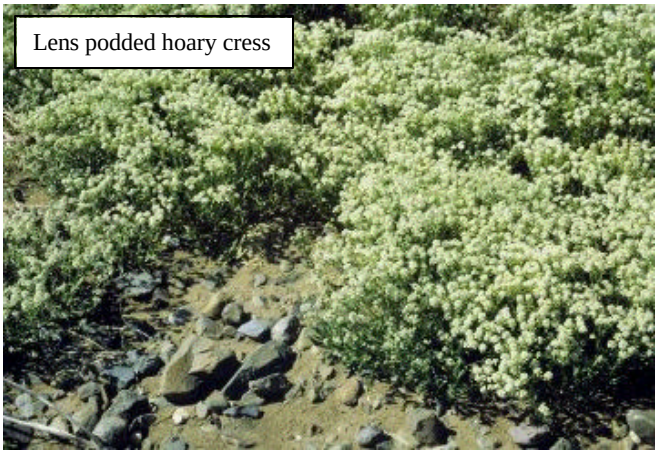
SYNONYMS:

- **lens-podded whitetop:** lens-podded hoary cress, whitetop, hoary cress, *Cardaria draba* (L.) Desv. var. *repens* (Schrenk) Rollins, *Lepidium draba* L. var. *repens* Thell
- **hoary cress:** whitetop, whiteweed, heart-podded hoary cress, perennial peppergrass, *Lepidium draba* L.
- **hairy whitetop:** globe-podded hoary cress, ball cress, white-top, hoary cress, *Cardaria pubescens* (C. Meyer) Jarmol. var. *elongata* Rollins, *Hymenophysa pubescens* C.A. Meyer

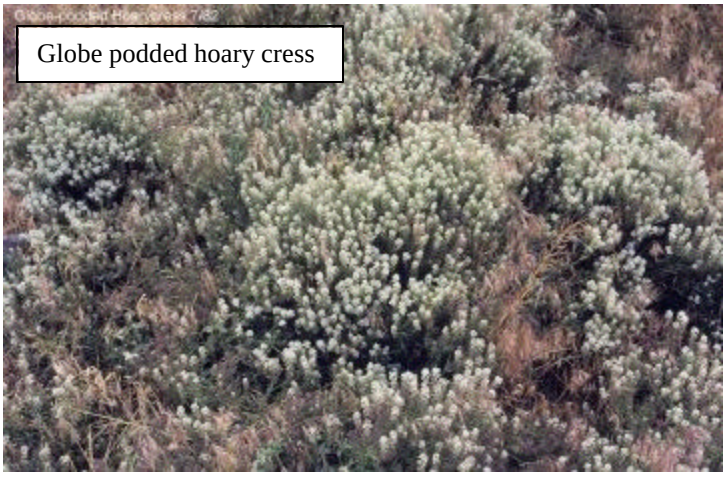
GENERAL DESCRIPTION:**Noxious perennials** to 0.4(0.5) m tall, with **creeping horizontal roots** that **vigorously** produce new plants. *Cardaria* species are problematic in natural areas and many crops, especially irrigated crops such as alfalfa and sugar beets. **Lens-podded** and **hairy whitetop** were introduced from Central Asia. **Hoary cress** was introduced from Eurasia.

PROPAGATION/PHENOLOGY:**Reproduce vegetatively from creeping roots** and less importantly **by seed**. Root fragments generate new plants, but regeneration is poor in dry soils. Under favorable conditions, plants often increase vegetatively by more than a 61 cm (2 ft) radius per year. Light stimulates seed germination but is not required. Seed germinates in the fall after the first rains. Plants typically do not flower the first year. One flowering stem of **lens-podded whitetop** or **hoary cress** can produce up to 850 mature pods. **Lens-podded** and **hairy whitetop** (and probably **hoary cress**) compete poorly with shrubs in natural communities.

- **lens-podded whitetop:** Seedlings recover from injury more readily than those of **hoary cress**.
- **hoary cress:** In 1 year, a single plant on open ground without competition can spread vegetatively to cover an area to 3.7 m (12 ft) in diameter and can produce up to 455 shoots. One plant can produce up to 4800 seeds, with ~ 85 % viability. Seed germinates at temperatures ranging from 0.5-40º C (optimum 20-35º C).


Lens podded hoary cress


Heart podded hoary cress


Globe podded hoary cress

Swamp smartweed or **Kelp** [*Polygonum amphibium* L. var. *emersum*
Common to Yolo County
River garden farms area

SYNONYMS:

- **swamp smartweed:** kelp, longroot smartweed, marsh smartweed, swamp knotweed or persicaria, devil's shoestring, tanweed, amphibious bistort,.

GENERAL DESCRIPTION: **Coarse emergent aquatic to terrestrial herbs**.

- **swamp smartweed:** Colonizing **perennial with creeping rhizomes** and erect to spreading stems to 1.5 m tall. Plants are highly plastic depending on environmental conditions. Aquatic plants with floating stems and leaves at flowering are known as **water smartweed** [*Polygonum amphibium* L. var. *stipulaceum*][POLAM]. Terrestrial and aquatic varieties intergrade, and some populations appear to convert from one variety to the other when environmental conditions change over time.
- **Swamp smartweed** are widespread natives of North America that typically grow on the edges or in ponds, marshes, lakes, streams, and areas subject to seasonal flooding or periodic standing water. In natural areas they are a desirable component of the flora. Plants provide cover for wildlife, and the seeds are an important food source for many species of songbirds, waterfowl, and mammals. However, these species sometimes invade rice fields, pastures, orchards, and irrigated crops, and stands of emergent plants can impede the flow of water in irrigation ditches, canals, and drainage areas.

PROPAGATION/PHENOLOGY: Seeds fall near and/or remain on the parent plant, or disperse to greater distances with water, animals, in soil movement, agricultural machinery, and as contaminants of crop seed. Seeds germinate in spring. Under certain conditions, fragmented stems regenerate into new plants.

- **swamp smartweed: Reproduces vegetatively from rhizomes and fragmented stems and by seed**. Stem pieces develop roots rapidly and can disperse great distances along watercourses to initiate new colonies. Populations derived from a single clone do not set seed. Seed production is typically lower in terrestrial plants.

Swinecress [*Coronopus squamatus*]
Not Common in Yolo County

[i] All information contained in these pages, comes from the following web site:
http://www.cdfa.ca.gov/phpps/ipc/encycloweedia/encycloweedia_hp.htm

EncycloWeedia

Notes on Identification, Biology, and Management of Plants Defined as Noxious Weeds by California Law

The California Department of Food and Agriculture created and supports this site as a resource for public use. The University of California, Davis brought together and organized the information in the sheets