***Gutierrezia sarothrae* (Pursh) Britt. & Rusby** broom snakeweed
ASTERACEAE

Synonyms: *Xanthocephalum sarothrae* (Pursh) Shinners
Solidago sarothrae Pursh
Gutierrezia diversifolia Greene
Gutierrezia linearis Rydb.

Illustration source: USDA-Forest Service collection, Hunt Institute

General Description.—*Gutierrezia sarothrae* is a woody perennial named for Pedro Gutierrez, a Spanish nobleman. The epithet "sarothrae" is a derivative of a Latin word meaning "broom." Its most popular common name is broom snakeweed, or snakeweed, but is also referred to as common matchbrush, broomweed, brownweed, yellow-top, yellow weed, resin-weed, turpentine-weed and, principally in Mexico, yerba de vibora (Dayton 1931). It has also many botanical synonyms and for a complete list see Kartesz (1994). The Navajo Native Americans call it Ch'il diilyesiitoh, "big dodge weed" (Mayes and Lacy 1994). Broom snakeweed is generally 20 to 60 cm tall with a dense crown. The young, greenish stems turn tan and then brown with age. It has linear green leaves up to 3.8 cm long and numerous small, bright-yellow flowers with two to seven rays that are 2 to 3 mm long. In its northern range it is deciduous and dies back, but within its southern range it commonly only dies back part way in winter (Cronquist 1994, Whitson et al. 1991). Snakeweed contains saponin, a toxic secondary product (Whitson et al. 1991). Details of the plant may be viewed on the Texas A&M University "Virtual Herbarium" Website (2000).

Range.—Broom snakeweed is native to the Americas. It is a very common shrub throughout Western North America, from Saskatchewan and Alberta, Canada south through western Nebraska and Kansas into Texas and central Mexico, and west to Washington, Oregon, California, and Baja California. Broom snakeweed has been described as a diagnostic climax member of desert grasslands (Dick-Peddie 1993). It is a member of both Chihuahuan and Sonoran desert grasslands (Schmutz et al. 1992). It has been estimated that it covers more acres than any other perennial plant on Navajo Tribal lands in the Southwestern United States (Mayes and Lacy 1994).

Ecology.—Broom snakeweed grows in dry, open places from 732 m to 2,898 m (Tirmenstein 1999). As its wide range suggests, it grows in a variety of soil conditions, from sandy and well-drained loam to heavy clay soils and in various plant communities, including Douglas-fir and ponderosa pine forests, pinyon-juniper woodlands, sagebrush shrublands, and desert grasslands. Broom snakeweed root systems are fairly shallow, which is unusual for a shrub adapted to semi arid and arid environments (Schmutz and others 1992). They occupy the same soil layers as those of perennial grasses and sometimes appear to compete with them (Burgess 1995). Broom snakeweed tends not to resprout after fire and frequently dies during drought (Schmutz et al. 1992). It suffers from drought to about the same extent as black grama grass, but when insect pressure is present the

snakeweed mortality is much higher (Dick-Peddie 1993). However, by virtue of its high seed production and rapid seedling establishment (Osman and Pieper 1988) it often increases, or "comes in", after prolonged drought and other disturbances (Dayton 1931).

Reproduction.—Snakeweed flowers from July to December depending upon the latitude and water availability. The plant is insect pollinated (Mayeux and Leotta 1981). It is a prodigious producer of seed that can remain viable in the soil for a considerable length of time (Osman and Pieper 1988). A single plant is capable of producing 9,000 to 10,000 seeds annually (Tirmenstein 1999). The oval fruit (seeds) are achenes and covered with stiff hairs or nearly glabrous. Chaffy scales, called the pappus, are on one end of the achene and aid seed dispersal by wind (Cronquist, 1994). Seeds are dispersed by animals as well as wind, although it has been reported that they also accumulate under the shrub canopy (Mayeux and Leotta 1981). Light enhances germination, which suggests that the best position for seeds is on or near the soil surface (Mayeux and Leotta 1981).

Growth and Management.—Snakeweed is not palatable and can be poisonous to livestock and increases under grazing pressure (Cable 1975; Carter 1988; Cronquist 1994; Pase and Pond 1964). Most losses in sheep and cattle are due to abortions (Whitson et al. 1991), but the plant also apparently affects the kidneys of both sheep and horses (Dayton 1931). Data suggest that the presence of jackrabbits may reduce cattle losses from poisonous plants because, under moderate stocking rates, jackrabbits consume increased amounts of poisonous plants and shrubs such as snakeweed but have minimal forage competition with cattle (Daniel et al. 1993). When abundant, snakeweed is generally considered an indicator of overgrazing (Dayton 1931; Hatch and Pluhar 1993; Powell, 1998). Pastures are also not properly utilized when broom snakeweed is present amongst the grasses (Whitson et al. 1991). Snakeweed is killed by certain borers and other insects. Species from the genera, *Crossidius*, *Diplotaxis,* and *Mecas* have been proposed as possible biological controls (Dayton 1931). Fire can be used to reduce snakeweed (Humphrey 1949; Tirmenstein 1999). However, the success of controlled burns depends upon fuel quantity and dryness, and an absence of grazing for at least one season prior to burning has been recommended (Tirmenstein 1999). In many cases, fire may prove an ineffectual control. For example, 5 years after a wildfire snakeweed had gone from 0 percent canopy cover to over 40 percent canopy cover on monitored plots in Arizona (Pase and Pond 1964). In west-central Utah broom snakeweed was found on eight out of the nine age-classes of burns, being absent on the 71-year-old burns and most abundant on the 22-year-old burns (Barney and Frischknecht 1974). Broom snakeweed is susceptible to some herbicides (Whitson et al. 1991).

Benefits.—Broom snakeweed provides some stability to the soil against both wind and water erosion (Tirmenstein 1999, USDAFS 1988). It is fair browse for wildlife but is poisonous to livestock due to the saponin content, which is variable and depends upon both growth phase and environmental conditions (Hatch and Pluhar 1993). The vegetation is most toxic during leaf formation (Whitson and others 1991). At times when there has been no alternative forage, snakeweed has been used by livestock with no ill effects (USDAFS 1988). Presumably saponin levels have been low at these times. It has several medicinal uses among the Navajo (Mayes and Lacy 1994). It is used to heal cuts and bites in humans and animals. A snakeweed medicine is given in childbirth and is used to treat stomachaches and other internal disorders. It is reported to be a powerful diuretic (Powell 1998). It is also used in various Navajo ceremonies including as an emetic and fumigent (Mayes and Lacy 1994). A yellow dye is made from the flowers, and the stems can be used to make fire by friction. Birds, for example quail, eat the seeds (Epple 1995). Broom snakeweed also provides cover and resting sites for species of small mammals, for example jackrabbits (Daniel and others 1993) and birds, for example lesser prairie chicken (USDAFS 1988) and Columbia basin burrowing owl (Green and Anthony 1989).

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