

to science and represented a new genus. Dorn (1991) named his discovery *Y. xanthocephalus*, or literally “desert yellowhead.”

*Yermo xanthocephalus* is a tap-rooted, glabrous (hairless) perennial herb with leafy stems to 30 centimeters (cm) (12 inches (in)) high. The leathery leaves are alternate, lance-shaped to oval, 4 to 25 cm (1.5 to 10 in) long and often folded along the midvein. Leaf edges are smooth or toothed. Flower heads are many (25 to 180) and crowded at the top of the stem. Each head contains four to six yellow disk flowers (ray flowers are absent) surrounded by five yellow, keeled involucre (whorled) bracts (small leaves beneath the flower). The pappus (the outer whorl of flowering parts) consists of many white bristles.

*Yermo xanthocephalus* flowers from mid-June to August and may flower a second time in September. The start and end of flowering, as well as the duration of flowering, vary between years and seem dependent upon temperature and other climatic variables. Fruits have been observed from mid-July to early September, but do not persist after the flower has dried and bracts ruptured (Heidel 2002).

*Yermo xanthocephalus* appears to be an obligate outcrosser (cannot self-pollinate) (Heidel 2002) and is likely pollinated by visually-oriented insects attracted to the yellow flowers (Dorn 1991). Several Hymenopterans (order including sawflies, ants, bees, and wasps) have been collected from *Y. xanthocephalus* heads, and small skipper butterflies noted on them, although the identity of these potential pollinators is not currently known (Heidel 2002). No work has been done to document the status of these potential pollinators in this vicinity. However, of the skippers known from Fremont County that most likely use *Y. xanthocephalus* habitat, all have Nature Conservancy Global Ranks of G–4 (apparently secure globally) and G–5 (demonstrably secure globally) with no special conservation or management needs identified by Opler *et al.* (1995).

The fruits of *Yermo xanthocephalus* are single-seeded achenes (dry fruit) with a parachute-like pappus of slender bristles. At maturity, the fruits are exposed to the wind, which may disperse the seed over long distances. However, the clustered distribution pattern of *Y. xanthocephalus*, often along colluvial (rock debris) washes, suggests that dispersal distances are short and perhaps fostered by water erosion (Heidel 2002).

The species is restricted to shallow deflation hollows in outcrops of

Miocene sandstones of the Split Rock Formation (Love 1961, Van Houten 1964). These hollows have been shaped by the microscale dynamics of local winds, as well as erosional processes, in an unstable portion of the landscape on sites lacking desert pavement and with low vegetation exposed to strong-wind (Bynum 1993). Within the hollows, *Yermo xanthocephalus* occurs on low slopes, rim margins, colluvial fans, and bottoms at elevations generally ranging from 2,050 to 2,060 meters (m) (6,720 to 6,760 feet (ft)) (Heidel 2002).

*Yermo xanthocephalus* grows in recent soils derived from sandstones and limestones of the Split Rock Formation at its junction with the White River Formation (Heidel 2002). Bynum (1993) found these are shallow, loamy soils of the Entisol order that can be classified as a coarse-loamy over sandy-skeletal mixed Lithic Torriorthent. In contrast, the surrounding sagebrush community occupies deep sandy loam of the Aridisol order. The surface stratum is mildly alkaline with little organic matter, while subsurface layers have no accumulation of humus, clay, gypsum, salts, or carbonates (Bynum 1993).

The shape and orientation of the wind-excavated hollows may allow for accumulation of moisture from sheet wash coming off adjacent areas, so the hollows may be more mesic (moist) than surrounding areas (R. Scott, Central Wyoming College, pers. comm. 2002). The vegetation of these sites is typically sparse, with vegetative cover often as low as 10 percent, and consists primarily of low-cushion plants and scattered clumps of Indian ricegrass (*Stipa hymenoides*). Species common to these communities include *Arenaria hookeri* (Hooker's sandwort), *Astragalus kentrophyta* (thistle milkvetch), *Hymenoxys acaulis* (stemless hymenoxys), and *Phlox muscoides* (squarestem phlox) (Fertig 1995). A more complete list of frequently associated species can be found in Heidel (2002).

*Yermo xanthocephalus* is currently known from a single population with plants widely scattered over an area of 20 ha (50 ac). This population consists of one large subpopulation at the base of Cedar Rim and two smaller subpopulations within 0.4 kilometer (km) (0.25 mile (mi)). Originally, Dorn observed approximately 500 plants within 1 ha (2.5 ac) in 1990 on Federal land managed by the BLM (Dorn 1991). The estimate of the plant population's size has increased from 500 in 1990 to 11,967 plants in 2001 (R. Scott, Central Wyoming College, pers. comm., 2001). However, Dorn's original estimate of

500 plants was an ocular estimate and did not include two nearby subpopulations, while Scott has been conducting extensive population censuses in all three subpopulations using a monitoring grid (Heidel 2002). Therefore, the difference in estimates may be largely the result of different techniques used over differing acreages and cannot be assumed to show a significantly increasing trend in population size between 1990 and 2001. Based upon Scott's data collected from 1995 through 2001, the actual population count has increased from 9,293 in 1995 to 11,967 in 2001, possibly in response to higher than normal precipitation over the study period (R. Scott, Central Wyoming College, pers. comm., 2001).

Surveys conducted between 1990 and 1994 failed to locate additional populations of *Yermo xanthocephalus* on outcrops of the Split Rock, White River, Wagon Bed, and Wind River formations in the Cedar Rim and Beaver Rim areas of southern Fremont County (Fertig 1995). No additional populations were located during follow-up surveys conducted during 1997 along Beaver Rim in Fremont and Natrona counties, as well as in the Shirley Basin in Carbon County (Heidel 2002). Additional surveys were conducted during 2001 in segments of Cedar Rim and Beaver Rim and surrounding areas not previously surveyed; however, no new populations were located (Heidel 2002).

*Yermo xanthocephalus* is vulnerable to extinction from randomly occurring, catastrophic events, as well as even small-scale habitat degradation, due to its small population size and limited geographic range. As described by Fertig (1995), the species is characterized by a long-lived perennial growth form, adaptation to severe habitats, and low annual reproductive output. This low reproductive output would make the species increasingly vulnerable to extinction due to chance events if the population size declined, because it is unlikely that the species would exhibit a high rate of population growth, even if environmental conditions improved after such an event.

While not known to have impacted *Yermo xanthocephalus* to date, oil and gas development could impact the population of *Y. xanthocephalus*. The known population is encompassed by, and adjacent to, oil and gas leases with no specific lease stipulations included to protect the plant. Construction of well pads, access roads, and pipelines through occupied habitat, as well as seismic exploration of oil and gas producing formations, could result in direct destruction or crushing of plants