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Plants of the Santa Cruz Valley at Tucson
Kathryn Mauz

Ambrosia confertifolia

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Plants of the Santa Cruz Valley at Tucson

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Prologue

“Almost the only other locality in the neighborhood of Tucson favorable for the growth of plants, is along the Santa Cruz river, a small stream which rises to the south of the city, flows past it, sinks into the ground some ten miles on the other side... A mile further up the stream we come to where it has been run into a sort of canal to run a mill, and along the side of the mountain, below the canal, where the ground is always moist, is a good growth of vegetation. ... The larger growth consists principally of willows and poplars [cottonwoods]... Along the banks of the stream is a little *Hydrocotyle*...and other plants loving damp localities, and in the water...*Potamogeton*...” (James, 1881:986).

Jos. F. James, Custodian for the Cincinnati Society of Natural History, made a trip West and wrote in 1881 with wonder and awe of the many peculiarities he found in Tucson and its environs – plants and otherwise. These were his words for the Valley of the Santa Cruz at Tucson itself. The mill to which he refers was probably Warner’s Mill at the base of Sentinel Peak, and the stretch of good vegetation was not far downstream of the confluence of the West Branch with the main channel. He was there in the same year (phenologically, in the same month!) that Cyrus Pringle collected the earliest specimens from the Santa Cruz at Tucson that are held at the University of Arizona Herbarium. Shortly after that year, accumulating land use change and feedbacks to the hydrology of this system incited deepening and widening of the Santa Cruz channel, and brought consequent losses of habitat and of species (Spalding, 1909; Bryan, 1922). The plants James mentions by name are the same ones that Thornber collected in the Valley twenty years later. By that time, there may still have been a small stream and forests along stretches of the Santa Cruz above Tucson (Lumholtz, 1912) – Thornber noted willows, monkeyflower, and *Hydrocotyle*, for instance, as common on the river (at least in places) in 1913. Ongoing bank collapse and periodic large floods (Bryan, 1922) had, by early century, contributed to retreat, fragmentation, and – importantly – lack

of regeneration of riparian vegetation. (Spalding, 1909). The West Branch of the Santa Cruz today is arroyo-like in places, but has been spared these drastic geomorphic changes. Its forest is not a relict – it continued to coexist with agriculture and has become a different kind of riparian ecosystem – but it is vibrant, and it is important for this and for its location so close to the urban center. In January 2002, it became open space through the Sonoran Desert Conservation Plan, and is an inspiration for the preservation of plant and creature biodiversity in the City.

Introduction

Professor Thornber had a cranky typewriter. The plants he collected during his first years in Tucson, after joining the University of Arizona faculty in 1901, are or are nearing at the time of this writing 100 years old. Many of the early accessions bear labels tapped out with carbon paper behind, on a typewriter that had a penchant for displacing letters, especially for dropping the “h” in his last name down by half a line. Some of the labels are penned in ink fading to a black-brown, most affixed to smooth, substantial paper (probably not archival) that has mellowed to rich shades of chamois over the intervening century. It wasn’t until I was thumbing my way through specimen sheets at the University of Arizona Herbarium (ARIZ), taking notes on his collections from the Santa Cruz and copying collection dates (e.g., ‘8-23-01’) that I realized the importance of the West Branch flora – and made a deliberate switch to using four-digit years in my notes. As the species stacked up, it began to appear that the collections at the West Branch of the Santa Cruz in 2001 were together a unique, species-level picture of a basin-floor setting in Tucson, perhaps the first to emerge since the early 1900s.

The floristic work on the West Branch of the Santa Cruz presented here began in July 2001, following an email from Phil Rosen at the University of Arizona who was working with a community group on a project south of downtown. The first trip revealed bees on a scraggly old *Koelerlinia* in bloom, sprouts of *Ipomoea* looking like green dragonflies scattered along the arroyo, and a little black-headed snake that Phil captured from under some urban debris (and then released back to its hiding place). Several more collecting trips over the ensuing several weeks produced an impressive inventory of plants for an agricultural and urbanizing watershed. Especially, this was a picture of a remarkable ecosystem – just off of south Mission Road that also happened to command a view of Tumamoc Hill, ‘A’ Mountain, the Catalinas, and the office buildings of downtown just a few miles to the northeast. The bosque is notable for both its huge and intermingling mesquite canopies and for its tangled understory, complicated with bugs and birds and the charismatic, if sometimes elusive, lizards and toads. Most of the photos that came back from the West Branch have some sort of arthropod in them, not so much intentionally as that it was difficult to find shots *without* them. The floodplain, even still with a five o’clock shadow lin-

gering from a past life in agriculture, is made of fine soil and supports patches of feather fingergrass, devil's claw, sharpleaf groundcherry, and bearded cupgrass. Relict, wandering channels of now-beheaded Church Wash (the diversion of which makes a beeline for the West Branch channel) are lined with wolfberry, quelite, and alkali sacaton.

Thornber's 1909 plant list for the Santa Cruz Valley in Tucson is introduced in Part 1 and is a suggestion of the riparian ecosystem that once ushered the Santa Cruz through the basin. The generality of location data for his (and others') collections from that time makes reconstructing the aerial extent (perhaps as much as 10-20 miles of the Santa Cruz Valley) of the valley floor represented in Thornber's list difficult. At the same time, the extent to which his collections were systematic or representative in time or space with respect to the valley's species richness or species' distributions is not known. At the very least, the 1909 list and turn-of-the-last century collections are invaluable documentation of 'presence' here at a time when the Santa Cruz was still alive but withering, made on the cusp of decades of accelerating urban and infrastructural growth that have left little of a river, its tributaries, or its aquifer functionally or structurally intact. Maps in Figure 1 (p.33) illustrate the Santa Cruz Valley at Tucson, the location of the West Branch of the Santa Cruz floristic area, and approximations of some of the locations where Thornber and others collected based on the brief descriptions with the specimens (see Part 1 for additional explanation on the selection of specimens).

Part 2 is the modern flora for the West Branch of the Santa Cruz based on field work conducted in 2001. Comparisons between these two lists are complicated by the above mentioned factors, with unambiguously interpreting absence of a taxon from either of the two floras, and in assumptions regarding levels of disturbance that characterized or characterize the Santa Cruz and West Branch ecosystems. The distributions of species across phenologies and growth forms represented at the West Branch are similar to those represented in Thornber's list for the Santa Cruz Valley (Figures 2 and 3, p.34). At the species level, a general change from hydriophariparian to mesoriparian vegetation is clear in the losses of several tree taxa from this part of the valley – Frémont cottonwood, Goodding and coyote willows, soapberry, netleaf hackberry, Mexican elder, ash, walnut, and screwbean mesquite – and the disappearance of aquatic and wet-footed herbs such as *Hydrocotyle*, *Zannichellia*, *Rorippa*, *Mimulus*, and the sedges. Velvet mesquite has persisted, forming a shady bosque along much of the West Branch through the study area. Present now are blue and Mexican palo verdes and an occasional salt cedar. Several characteristically valley-floor species remain in common, notably the saltbushes, quelite, and alkali sacaton; *Koeberlinia* (at least in the form of a few tenacious individuals) is still here. Among the plants that Thornber had listed for upland sites, but not for the valley, that are present on the West Branch today are *Aristida* species, sand dropseed, *Psilostrophe*, jo-

joba, two species of cactus, and creosote bush. Two-thirds of the herbs and grasses listed in 1909 may be gone, and half of the herbs and grasses at the West Branch in 2001 may be new in the last century.

Part 1. Thornber's Plants of the Santa Cruz Flood-Plain, 1909 – Revised and Updated, with Citations

University of Arizona Botany professor and Herbarium curator, John J. Thornber (1872-1962), contributed a chapter to the Carnegie Desert Laboratory publication, *Distribution and Movements of Desert Plants*, entitled "Vegetation Groups of the Desert Laboratory Domain" (Thornber, 1909) that was based on plant collections and observations made in the earliest years of the Twentieth Century. The flora was subdivided into four physiographic zones: Tumamoc Hill (I), mesa-like mountain slopes (II), the Santa Cruz floodplain (III), and the Santa Cruz River and irrigation ditches (IV). In addition to these four groups, a fifth, Miscellaneous Introduced Species, included exotic species "limited almost wholly to area III, though a few occur in I and II" (Thornber, 1909:103). While the last group represents many conspicuous or troublesome weeds, there are non-native species in the other plant groups (I-IV), as well. The plants of Zone IV are described as "hydrophytic species growing in the Santa Cruz River and adjacent irrigation ditches" (Thornber, 1909:103).

The list for Tumamoc Hill, Thornber's Zone I and including Zone II, was thoroughly revised and expanded by Bowers and Turner (1985). The Flora and Vegetation of the Tucson Mountains (Rondeau et al., 1996) incorporated Tumamoc Hill taxa and certainly expanded upon Thornber's Zone II. The present treatment regards the plant taxa that Thornber listed as occurring in his Zone III (Santa Cruz Flood-Plain), Zone IV (Santa Cruz River and Irrigation Ditches), and the category, Miscellaneous Introduced Species; taxa whose primary occurrence was in Zones I or II but which were listed also for his Zone III are also accommodated here.

Combining these groups, Thornber's original list included 194 vascular plant species (he also listed several species of alga) in 47 families. The revision of this list resulted in four taxa being recombined or revised, six taxa being omitted, and twelve being added for which Thornber had made collections in the Santa Cruz Valley in Tucson prior to the 1909 publication, but which he had not included on his list. The revised list, then, includes 196 taxa (72 percent native) in 48 families, and is presented in Section I. Voucher specimens dated through 1909, for localities in the Santa Cruz Valley at Tucson, were located at ARIZ for 116 of these 196 taxa; specimens for an additional 16 taxa on this list collected after 1909 are also cited here. Localities provided on labels that are recognized here include the Santa Cruz River, Santa Cruz Valley, Santa Cruz bottoms, or irrigation ditches, as well as specimens whose descriptive location

could be inferred as representing the floodplain (or what once was the floodplain) in Tucson. Ninety-five percent of all of the specimens fulfilling these criteria were made prior to 1920.

Section II includes six species collected in the Santa Cruz Valley at Tucson after 1909, that were not in Thorner's list and were not observed on the West Branch of the Santa Cruz in 2001, but for which there are, nonetheless, specimens at ARIZ. Section III lists six species that were on Thorner's original list but which were omitted from the revised list and counts, and provides explanations for these omissions. Species for which no Santa Cruz voucher specimens exist have been retained except when there was clear reason to omit them; in many of these cases, specimens do exist for "Tucson" or for the Rillito Valley to the north and east.

In each section, taxa are listed alphabetically first by family and then by genus, species, and infraspecific taxon. In each entry, the current taxonomy is listed first, followed by Thorner's listing in brackets, including his descriptors for zone (zones of secondary occurrence are in parentheses), growth form (modified from his, where "vines" includes his 'woody climbers' as well as some of his herbs), phenology (W=warm season, C=cool season, U=non-seasonal), and longevity (P=perennial or biennial, A=annual). A list of the collections at ARIZ concludes each entry. A beta (B) character indicates a species for which no collections from the Santa Cruz Valley were located at ARIZ. A diesis symbol (‡) indicates a species that is also listed in Part 2 for the West Branch of the Santa Cruz in 2001 (n=76). An asterisk (*) indicates a non-native species (n=55).

I. Plants in Thorner's Zones III, IV, and Miscellaneous Introduced Species (M), with Citations

ACANTHACEAE

‡ *Ruellia nudiflora* (Engelmann & A. Gray) Urban var. *glabrata* Leonard [*Ruellia clandestina* Linnaeus; Zones (II), III; herbs, W, P.] Thorner 4942, 23 Aug 1901, 4 mi NW of Tucson; *L. Swingle S.302*, July 1916, Santa Cruz floodplains; *D. McDowell s.n./ARIZ 30542*, 28 Nov 1936, irrigation ditch bank, Tucson.

AIZOACEAE

B ‡ *Trianthema portulacastrum* Linnaeus [*Trianthema portulacastrum* Linnaeus; Zones II, (III); herbs, W, A.]

AMARANTHACEAE

* *Amaranthus graecizans* Linnaeus [*Amaranthus graecizans* Linnaeus; Zone M; herbs, C, A.] Thorner 2546, 30 Oct 1902, Santa Cruz Valley, Tucson;

Thorner s.n./ARIZ 4475, 16 Oct 1904, Tucson (this specimen annotated from *A. blitoides* S. Watson, which Thorner had listed separately).

‡ *Amaranthus palmeri* S. Watson

[*Amaranthus palmeri* S. Watson; Zone III; herbs, W, A.] Thorner 2543, 27 Oct 1902, Santa Cruz Valley, Tucson.

B ‡ *Tidestromia lanuginosa* (Nuttall) Standley

[*Cladotrix lanuginosa* Nuttall; Zones II, (III); herbs, W, A.] ARIZ specimens for this species were not accessible at the time of this writing.

APIACEAE

Hydrocotyle ranunculoides Linnaeus f.

[*Hydrocotyle ranunculoides* Linnaeus f.; Zone IV; aquatic herbs, W, P.] Thorner s.n./ARIZ 15638, 30 April 1904, Manning irrigation ditch, Tucson; Thorner s.n./ARIZ 15636, 10 May 1913, Santa Cruz River bed, Tucson – "a common species, often growing in wet sand".

ASCLEPIADACEAE

Asclepias subverticillata (A. Gray) Vail

[*Asclepias galioides* Kunth; Zone III; herbs, W, P.] Shreve s.n./ARIZ 98908, 9 Oct 1908, "near irrigation ditch, W Congress St, Tucson".

‡ *Sarcostemma cynanchoides* Decaisne subsp. *cynanchoides*

[*Philibertia cynanchoides* (A. Gray) Vail; Zone III; herbs, W, P.] Thorner s.n./ARIZ 98920, 23 Aug 1901, 4 mi NW of Tucson; Thorner 2556, 27 Oct 1902, Santa Cruz Valley, Tucson; Thorner 709, 23 Aug 1904, Santa Cruz River Valley, Tucson; Thorner s.n./ARIZ 322651, 20 Aug 1905, Santa Cruz bottoms.

B *Sarcostemma cynanchoides* Decaisne subsp. *hartwegii* (Vail) R. Holm [*Philibertia hartwegii* Vail var. *heterophylla* (Engelmann) Vail; Zone III; herbs, W, P.]

ASTERACEAE

‡ *Ambrosia confertiflora* de Candolle

[*Franeria tenuifolia* A. Gray; Zones II, (III); herbs, W, P.] Thorner 2549, 27 Oct 1902, Santa Cruz Valley, Tucson; Thorner 41, 24 Sept 1903, Santa Cruz bottoms, Tucson; Thorner s.n./ARIZ 56978, 24 Sept 1903, Santa Cruz flood plains, Tucson – "common".

Ambrosia trifida Linnaeus var. *texana* Scheele

[*Ambrosia aptera* de Candolle; Zone III; herbs, W, A.] Thorner 6, 22 Sept 1903, "common weed of Santa Cruz Valley, Tucson"; Thorner s.n./ARIZ 52109, 24 Sept 1903, Santa Cruz flood plains, Tucson.

* *Anthemis cotula* Linnaeus [*Anthemis cotula* Linnaeus; Zone M; herbs, C, A.] *Thornber* 357, 30 April 1903, Santa Cruz bottoms, Tucson; *Thornber* 358, 12 May 1903, Santa Cruz bottoms, Tucson.

β *Aster commutatus* (Torr. & A. Gray) A. Gray var. *crassulus* (Rydberg) S. F. Blake [*Aster hebecladus* de Candolle; Zone III; herbs, W, P.]

Baccharis salicifolia (Ruiz & Pavón) Persoon [*Baccharis viscosa* Ruiz & Pavón; Zone III; shrubs, W, P.] *Thornber* s.n./ARIZ 53383, 21 Aug 1901, Tucson (collected on the same date as an *Atriplex elegans* in "low, salty washes"); *Thornber* 5346, 28 Sept 1913, Santa Cruz bottoms, Tucson.

β † * *Centaurea melitensis* Linnaeus [*Centaurea melitensis* Linnaeus; Zone M; herbs, C, A.] There are no collections of this plant at ARIZ from the Santa Cruz Valley; it was observed in 1915: "roadsides, Tucson—a bad weed" (A. Conrad s.n./ARIZ 54937).

Chloracantha spinosa (Benth) Nesom [*Aster spinosus* Benth; Zone III; herbs, W, P.] *Thornber* s.n./ARIZ, 28 Aug 1901, Santa Cruz Valley, Tucson; *Thornber* 4428, 17 November 1901, Santa Cruz Valley, Tucson; *Thornber* s.n./ARIZ 53260, 25 Oct 1902, Valley Santa Cruz, Tucson; *Thornber* 34, 24 Sept 1903, Santa Cruz Valley, Tucson; *Thornber* 4867, 1 Oct 1909, Santa Cruz Valley, Tucson; D.McDowell s.n./ARIZ 53278, 12 Dec 1936, Santa Cruz Valley, Tucson.

† *Conyza canadensis* (Linnaeus) Cronquist [*Erigeron canadensis* Linnaeus; Zone M; herbs, W, A.] *Thornber* s.n./ARIZ 56060, 25 Oct 1902, Valley Santa Cruz, Tucson.

† *Conyza coulteri* A. Gray [*Conyza coulteri* A. Gray; Zones (II), III; herbs, W, A.] *Thornber* s.n./ARIZ 55513, 5 Sept 1902, Tucson (collected on the same date as *Physalis longifolia* in "Santa Cruz bottoms").

* *Eclipta prostrata* (Linnaeus) Linnaeus [*Eclipta alba* (Linnaeus) Hasskarl; Zone III; herbs, W, A.] *Thornber* 2358, 28 Aug 1901, Santa Cruz Valley, Tucson; D.McDowell s.n./ARIZ 55893, 12 Dec 1936, irrigation ditch, Santa Cruz Valley, Tucson.

† *Erigeron divergens* Torrey & A. Gray [*Erigeron divergens* Torrey & A. Gray; Zone III; herbs, W, A.] *Thornber* 439, 25 May 1903, "northwest of Tucson".

Eriophyllum lanosum A. Gray [*Actinolepis lanosa* A. Gray; Zones II, (III); herbs, C, A.] *Thornber* 384, 10 April 1903, Santa Cruz bottoms, Tucson; *Thornber* 4394, 23 April 1903, Santa Cruz Valley, Tucson.

β † *Gutierrezia microcephala* (de Candolle) A. Gray [*Gutierrezia microcephala* (de Candolle) A. Gray; Zone III; herbs (counted with subshrubs), W, P.]

Helenium thurberi A. Gray [*Helenium thurberi* A. Gray; Zone III; herbs, W, P.] *Thornber* 2359, 28 Aug 1901, Santa Cruz Valley, Tucson; *Thornber* s.n./ARIZ 57636, 10 May 1913, Santa Cruz bottoms, Tucson – "common".

* *Helianthus annuus* Linnaeus [*Helianthus annuus* Linnaeus; Zone III; herbs, W, A.] *Thornber* 4966, 1 Oct 1909, Santa Cruz Valley, Tucson; *Thornber* 5341, Oct 1913, Santa Cruz bottoms, Tucson.

Helianthus petiolaris Nuttall [*Helianthus petiolaris* Nuttall (as var. *canescens* A. Gray); Zone III; herbs, W, A.] *Thornber* 5506, 20 May 1903, Grosetta's Ranch, Tucson; *Thornber* 314, 17 June 1903, Grosetta's Ranch, Tucson; *Thornber* s.n./ARIZ 322654, 20 Aug 1905, Santa Cruz bottoms, Tucson.

* *Hemizonia kelloggii* Greene [*Hemizonia wrightii* Linnaeus; Zone M; herbs, C, A.] *Thornber* 386, 12 May 1903, "Tucson" (collected on the same date as three other species labeled with "Santa Cruz Valley" or "Santa Cruz bottoms"); this species was also collected from "Mesas, Tucson" where Thornber remarked in April 1905: "An introduced weed, common about habitations on the mesas."

* *Hemizonia pungens* (Hooker & Arnott) Torrey & A. Gray [*Hemizonia fitchii* A. Gray; Zone M; herbs, C, A.] *Thornber* s.n./ARIZ 57805, 30 May 1903, Santa Cruz bottoms, Tucson (annotation of 1940: "only Arizona record").

β *Heterotheca subaxillaris* (Lamarck) Britton & Rusby [*Heterotheca subaxillaris* (Lamarck) Britton & Rusby; Zone III; herbs, C, A.]

β † *Hymenothrix wislizeni* A. Gray [*Hymenothrix wislizeni* A. Gray; Zone III; herbs, W, P.]

β † *Isocoma coronopifolia* (A. Gray) Greene [*Isocoma hartwegii* (A. Gray) Greene; Zones (I), II, (III); subshrubs, W, P.] Thornber described this species as "a common weed" in the Tucson Mountains in 1903 (*Thornber* s.n./ARIZ 360619), but there are no collections of this at ARIZ from the Santa Cruz Valley.

† *Iva ambrosiaefolia* A. Gray [*Gaertneria* sp.; Zone III?; herbs, W, A.] This species was not listed by Thornber 1909. *Thornber* 125, 13 September 1903, Martinez Ranch "12 miles south of Tucson" (possibly a Santa Cruz floodplain collection).

Lasthenia chrysostoma (Fischer & C.A. Meyer) Greene var. *gracilis* (de Candolle) Hall [*Baeria gracilis* (de Candolle) A. Gray; Zones II, (III); herbs, C, A.] *Thornber s.n./ARIZ 53585*, 23 April 1903, Santa Cruz River bottoms, Tucson.

‡ *Machaeranthera coulteri* (A. Gray) Turner & Horne var. *arida* (Turner & Horne) Turner [*Aster parviflorus* A. Gray; Zone III; herbs, U, A.] *Thornber s.n./ARIZ 30648*, 23 Aug 1901, "NW Tucson, in alkali beds"; *Thornber 2475*, 24 May 1905, Santa Cruz Valley, Tucson – "in alkaline soil" (this specimen as *Machaeranthera* sp.).

* *Matricaria matricarioides* (Lessing) Porter [*Matricaria matricarioides* (Lessing) Porter; Zone M; herbs, C, A.] *Thornber 422*, 11 April 1903, Santa Cruz bottoms, Tucson; *Thornber s.n./ARIZ 58408*, 10 May 1913, Santa Cruz bottom lands, Tucson.

ß *Parthenice mollis* A. Gray
[*Parthenice mollis* A. Gray; Zone III; herbs, W, A.]

Solidago altissima Linnaeus
[*Solidago canadensis* Linnaeus var. *arizonica* A. Gray; Zone III; herbs, W, P.] *Mrs. Aguirre s.n./ARIZ 59650*, n.d., San Xavier Mission (this specimen is of the same vintage as her *Ruellia nudiflora* collection of 1888 at "Tucson"); *Thornber s.n./ARIZ 59638*, n.d., Santa Cruz Valley, Tucson; *Mrs. J.J. Thornber 5378*, 27 Sept 1902, Santa Cruz River, Tucson.

* *Sonchus asper* (Linnaeus) Hill
[*Sonchus asper* (Linnaeus) Allioni; Zone M; herbs, C, A.] *Thornber s.n./ARIZ 60070*, 23 April 1903, Santa Cruz bottoms, Tucson.

‡ * *Sonchus oleraceus* Linnaeus
[*Sonchus oleraceus* Linnaeus; Zone M; herbs, C, A.] *Thornber s.n./ARIZ 60053*, 28 Aug 1901, Valley Santa Cruz, Tucson; *Thornber s.n./ARIZ 187949*, 23 April 1903, Santa Cruz bottoms, Tucson; *Thornber 466*, 30 May 1903, Santa Cruz bottoms, Tucson; *Thornber s.n./ARIZ 60046*, 16 May 1913, Santa Cruz bottoms, Tucson.

Stephanomeria exigua Nuttall var. *exigua* [*Stephanomeria exigua* Nuttall; Zones (I), II, (III); herbs, C, A.] *Thornber 463*, 20 May 1903, Grosetta's Ranch, Tucson.

Symphyotrichum subulatum (Michaux) Nesom
[*Aster exilis* Elliott; Zone III; herbs, W, A.] *Thornber 35*, 24 Sept 1903, Santa Cruz bottoms, Tucson; *Thornber 5264*, 24 Sept 1903, Santa Cruz Valley, Tucson; *Thornber 5353*, 5 Oct 1913, Santa Cruz bottoms, Tucson.

Tessaria sericea (Nuttall) Shinnors
[*Pluchea sericea* (Nuttall) Coville; Zone III; shrubs, C, P.] *Thornber s.n./ARIZ 58855*, 16 Nov 1901, Santa Cruz bottoms, Tucson; *Thornber 5500*, 30 May 1904, Santa Cruz River bottoms, Tucson; *Thornber s.n./ARIZ 320328*, 21 May

1904, Santa Cruz Valley, Tucson; *Thornber 450*, 13 May 1904, Santa Cruz bottoms, Tucson.

ß ‡ *Verbesina encelioides* (Cavanilles) Benth & Hooker [*Verbesina encelioides* (Cavanilles) Benth & Hooker; Zone III; herbs, U, A.]

‡ * *Xanthium strumarium* Linnaeus
[*Xanthium commune* Britton; Zone M; herbs, W, A.] *Thornber 8*, 20 Sept 1903, Santa Cruz Valley, Tucson.

BRASSICACEAE

* *Brassica nigra* (Linnaeus) Koch
[*Brassica nigra* (Linnaeus) Koch; Zone M; herbs, C, A.] *D.Griffiths 2713*, n.d. (probably early 1901), "Santa Cruz"; *Loomis, Peebles, Harrison, & Kearney 1286*, 24 Mar 1926, "near Tucson – field weed".

ß * *Capsella bursa-pastoris* (Linnaeus) Medikus
[*Capsella bursa-pastoris* (Linnaeus) Medikus.; Zone M; herbs, C, A.]

‡ *Descurainia pinnata* (Walter) Britton
[*Sisymbrium canescens* Nuttall; Zones (I), (II), III; herbs, C, A.; including *Sisymbrium incisum* Engelm.; Zone III; herbs, C, A.] *Thornber s.n./ARIZ 47772*, 2 May 1913, Santa Cruz bottom lands, Tucson.

ß *Lepidium thurberi* Wooton
[*Lepidium thurberi* Wooton.; Zone III; herbs, C, A.]

‡ * *Matthiola longipetala* (Ventenat) de Candolle
[*Matthiola bicornis* (Sibthorp) de Candolle; Zone M; herbs, C, A.] *E.M.Porter s.n./ARIZ 180494*, 15 April 1971, "in sandy soil in Santa Cruz River Bottom, 1 mi. west of Cortaro"; *C.Monson s.n./ARIZ 238765*, 8 Feb 1983, "Santa Cruz River at El Camino del Cerro".

* *Rorippa nasturtium-aquaticum* (Linnaeus) Hayek
[*Rorippa nasturtium* (Linnaeus) Rusby; Zone IV; aquatic herbs, W, P.] *Thornber 454*, 13 May 1904, "Tucson, Manning irrigation ditch"; *Thornber s.n./ARIZ 48471*, 13 May 1904, Santa Cruz River.

CAPPARACEAE

‡ *Polanisia trachysperma* Torrey & A. Gray
[*Polanisia trachysperma* Torrey & A. Gray; Zones III?, IV?; herbs, W, A.] This species was not listed by Thornber, 1909. *Thornber 4115*, 21 Sept 1901, Santa Cruz bottoms, Tucson; *Thornber s.n./ARIZ 48845*, 28 July 1913, Santa Cruz River, Tucson – "not a common species".

Wislizenia refracta Engelm. subsp. *refracta*
[*Wislizenia refracta* Engelm.; Zone III; herbs, U, A.] *Thornber 4116*, 21 Sept 1901, Santa Cruz bottoms, 4 mi

NW of Tucson; Thornber notes on 1913, Rillito Valley specimen – “an abundant weed”.

CAPRIFOLIACEAE

Sambucus nigra Linnaeus subsp. *cerulea* Rafinesque
[*Sambucus mexicana* Presl; Zone III; trees, W, P.] *Thornber s.n./ARIZ 117910*, 20 July 1913, Santa Cruz River near San Xavier; *Thornber 8146*, 15 April 1915, Santa Cruz Valley, Tucson; *Thornber* notes on 1903, Ft. Lowell specimen – “A fine evergreen tree”.

CARYOPHYLLACEAE

♂ * *Silene anglica* Linnaeus
[*Silene gallica* Linnaeus; Zone M; herbs, C, A.] *Dr. & Mrs. Vinson s.n./ARIZ 45791*, March 1906, “Tucson” (this is the only Tucson collection).

CHENOPODIACEAE

‡ *Atriplex canescens* (Pursh) James
[*Atriplex canescens* (Pursh) James; Zone III; shrubs, W, P.] *Thornber s.n./ARIZ 43835*, 2 Sept 1901 & 12 Oct 1901, “Tucson, Santa Cruz Val.”; *Thornber 111*, 3 Oct 1903, 4 mi NW Tucson.

Atriplex elegans (Moquin) Dietrich subsp. *fasciculata* (S. Watson) Hall & Clements [as *Atriplex elegans* S. Watson; Zone III?; herbs, W, A.] This species was not listed by *Thornber*, 1909. *Thornber s.n./ARIZ 43873*, 21 Aug 1901, “Low, salty washes, Tucson”; *Thornber 131*, 2 Sept 1903, Tucson; *Thornber 197a* (UC, Hall & Clements 1923 cit.: “form intermediate to subspecies *fasciculata*”); *Spalding & Thornber s.n./ARIZ 43872*, 3 April 1906, “Tucson Mtns., south slope along San Xavier Mission”; *C.B. Carter(?) s.n./ARIZ 43930*, 1 Oct 1933, “St. Mary’s Road, Tucson – St. Cruz flood plain”. [as *Atriplex fasciculata* S. Watson; Zone III?; herbs, W, A.] This species was not listed by *Thornber*, 1909. *Thornber 4970*, 27 July 1913, “5 mi NW of Tucson along S.P.R.R. in alkaline soil”; *J.A. Harris 14180*, April 1914, “north side of San Xavier Mission, Santa Cruz Valley, Tucson, salt spot”; *Thornber s.n./ARIZ 43871*, 25 May 1903, “4 mi NW in alkaline soil, Tucson”.

‡ *Atriplex linearis* S. Watson
[*Atriplex nuttallii* S. Watson; Zone III?; subshrubs, W, P.] This species was not listed by *Thornber*, 1909. *Thornber s.n./ARIZ 43896*, 23 Aug 1901, 4 mi. NW of Tucson, Santa Cruz River Valley; *Thornber 110a*, 3 Sept 1903, 4 mi. NW of Tucson.

‡ *Atriplex polycarpa* (Torrey) S. Watson
[*Atriplex polycarpa* (Torrey) S. Watson; Zone III; shrubs, W, P.] *Thornber 109a*, 3 Sept 1903, 4 mi NW Tucson – “flowers”; *Thornber 109*, 3 Oct 1903, 4 mi NW Tucson – “fruits”.

Chenopodium berlandieri Moquin
[*Chenopodium album* Linnaeus; Zone M; herbs, C, A.] *Thornber s.n./ARIZ 44047*, 13 June 1913, Santa Cruz River bottomlands; *Thornber s.n./ARIZ 44062*, June 1913, Santa Cruz River near San Xavier Mission.

Chenopodium desiccatum A. Nelson
[*Chenopodium leptophyllum* Nuttall; Zone III; herbs, C, A.] *Thornber s.n./ARIZ 44119*, 16 May 1913, Santa Cruz bottoms – “a common weed”; *Thornber s.n./ARIZ 44115*, June 1913, Santa Cruz River, San Xavier; *Thornber s.n./ARIZ 44121*, 27 July 1913, 5 mi NW of Tucson – “among willows”.

♂ *Chenopodium fremontii* S. Watson
[*Chenopodium fremontii* S. Watson; Zone III; herbs, W, A.]

* *Chenopodium murale* Linnaeus
[*Chenopodium murale* Linnaeus; Zone M; herbs, C, A.] *Thornber 2547*, 27 Oct 1902, Santa Cruz Valley, Tucson.

Monolepis nuttalliana (Schultes) Greene
[*Monolepis nuttalliana* (Roemer & Schultes) S. Watson; Zone III; herbs, C, A.] *Shreve 10076*, 27 March 1941, Santa Cruz flood plain – “abundant winter annual”.

‡ *Suaeda torreyana* S. Watson
[*Suaeda moquini* (Torrey) Greene; Zone III; subshrubs, W, P.] *Thornber s.n./ARIZ 44375*, 23 Aug 1901, “5 mi NW of Tucson”; *Thornber s.n./ARIZ 44382*, 3 Oct 1903, Santa Cruz floodplains.

CONVOLVULACEAE

* *Convolvulus arvensis* Linnaeus
[*Convolvulus arvensis* Linnaeus; Zone M; herbs, W, P.] *Thornber s.n./ARIZ 75695*, 3 July 1913, “Santa Cruz Valley, near Elysian Grove, Tucson”; *Thornber 8144*, 15 April 1915, Santa Cruz Valley, Tucson; *Thornber 7522*, 12 April 1916, Santa Cruz Valley, Tucson.

♂ *Cuscuta salina* Engelmänn
[*Cuscuta salina* Engelmänn; Zone III; herbs, W, A.]

♂ *Ipomoea cristulata* H. Hallier
[*Ipomoea coccinea* Linnaeus; Zone III; herbs, W, A.]

‡ *Ipomoea hederacea* Jacquin
[*Ipomoea hederacea* Jacquin; Zone III; herbs, W, A.] *Thornber 5513*, 23 Sept 1910, Santa Cruz River Valley, Tucson.

♂ *Ipomoea purpurea* (Linnaeus) Roth
[*Ipomoea purpurea* (Linnaeus) Roth; Zone M; herbs, W, A.]

CUCURBITACEAE

‡ *Cucurbita digitata* A. Gray

[*Cucurbita digitata* A. Gray; Zone III?; vines, W, P.] This species was not listed by Thornber, 1909. *Thornber* 24, 22 Sept 1903, Santa Cruz Valley, Tucson.

CYPERACEAE

? *Cyperus esculentus* Linnaeus

[*Cyperus esculentus* Linnaeus; Zone III; herbs, W, P.] *Shreve* s.n./ARIZ 36793, 13 Sept 1908, "N of Tucson, S of Rillito river in moist ditch". Thornber also collected this plant in the Rillito floodplain; there are no specimens at ARIZ from the Santa Cruz River.

Cyperus odoratus Linnaeus

[*Cyperus ferax* Richard; Zone III; herbs, W, A.] *Thornber* 42, 24 Sept 1903, Santa Cruz River, Tucson.

β *Cyperus squarrosus* Linnaeus

[*Cyperus aristatus* Rottboell; Zone III; herbs, U, A.]

EUPHORBACEAE

Euphorbia albomarginata Torrey & A. Gray

[*Euphorbia albomarginata* Torrey & A. Gray; Zones II, (III); herbs, U, P.] *C.G.Pringle* s.n./ARIZ 84403, 2 May 1881, Santa Cruz Valley near Tucson.

‡ *Euphorbia heterophylla* Linnaeus

[*Euphorbia heterophylla* Linnaeus; Zone III?; herbs, W, A.] This species was not listed by Thornber, 1909. *Thornber* 5987, Aug 1907, Santa Cruz bottoms, Santa Cruz River, Tucson.

‡ *Euphorbia hyssopifolia* Linnaeus

[*Euphorbia preslii* Gussone; Zone III; herbs, W, A.] *Thornber* 2545, 30 Oct 1902, Santa Cruz Valley, Tucson; *Thornber* 5989, 1 Aug 1906, Santa Cruz bottoms, Santa Cruz River, Tucson.

FABACEAE

Acacia angustissima (Miller) Kuntze var. *suffrutescens* (Rose) Isely [*Acacia filiculoides* (Cavanilles) Trelease; Zone III; subshrubs, W, P.] *Thornber* s.n./ARIZ 00125, 28 Aug 1901, Santa Cruz bottoms; *Thornber* 2042, 20 Sept 1901, Santa Cruz Valley; *Thornber* 2021, 25 Oct 1902, Santa Cruz Valley, Tucson; *Thornber* 7, 22 Sept 1903, Santa Cruz Valley, Tucson.

‡ *Acacia greggii* A. Gray

[*Acacia greggii* A. Gray; Zones (II), III; trees, C, P.] *Thornber* s.n./ARIZ 322589, 28 Aug 1901, Tucson (this specimen was collected on the same date as *A. angustissima*, above, in the "Santa Cruz bottoms").

* *Caesalpinia gilliesii* Wallich

[*Poinciana pulcherrima* Swartz var. *flava* F.T.Hubbard & Rehder; Zone M; shrubs, U, P.] *Thornber* s.n./ARIZ 320344, 30 May 1903, Santa Cruz Valley, Tucson.

β *Hoffmanseggia glauca* (Ortega) Eifort

[*Hoffmanseggia stricta* Benth; Zones (II), III; herbs, C, P.]

β * *Medicago polymorpha* Linnaeus

[*Medicago hispida* Gaertner; Zone M; herbs, C, A.]

β ‡ * *Melilotus indicus* (Linnaeus) Allioni

[*Melilotus indica* (Linnaeus) Allioni; Zone M; herbs, C, A.]

Prosopis pubescens Benth

[*Prosopis odorata* Torrey & Frémont; Zone III; trees, W, P.] *Thornber* s.n./ARIZ 67030, 21 May 1904, Santa Cruz Valley, Tucson; *Thornber* 451, 21 May 1904, Santa Cruz bottoms, Tucson.

β ‡ *Prosopis velutina* Wooton

[*Prosopis velutina* Wooton; Zones (II), III; trees, C, P.]

GERANIACEAE

β * *Erodium cicutarium* (Linnaeus) L'Héritier

[*Erodium cicutarium* (Linnaeus) L'Héritier; Zone M; herbs, C, A.]

HYDROPHYLLACEAE

β *Nama hispidum* A. Gray

[*Nama hispida* A. Gray; Zone III; herbs, C, A.]

JUGLANDACEAE

β *Juglans major* (Torrey) Heller

[*Juglans major* (Torrey) Heller; Zone III; trees, W, P.]

KOBERLINIACEAE

β ‡ *Koeberlinia spinosa* Zuccarini

[*Koeberlinia spinosa* Zuccarini; Zone III; shrubs, W, P.]

LAMIACEAE

* *Marrubium vulgare* Linnaeus

[*Marrubium vulgare* Linnaeus; Zone M; subshrubs, W, P.] *Thornber* s.n./ARIZ 13205, 12 May 1903, Santa Cruz bottoms, Tucson.

Teucrium canadense Linnaeus

[*Teucrium canadense* Linnaeus var. *angustatum* A. Gray; Zone III; herbs, C, P.] *Thornber* 455, 25 May 1904, Santa Cruz bottoms, Tucson; *Thornber* s.n./ARIZ 164164, 25 May 1904, Santa Cruz Valley, Tucson; *Thornber* s.n./ARIZ 61095, 20 July 1913, San Xavier Indian Reservation, Tucson.

Teucrium cubense Linnaeus subsp. *depressum* (Small) McClintock & Epling [*Teucrium cubense* Linnaeus; Zone III; herbs, C, P.] *Thornber s.n./ARIZ 61060*, 21 May 1904, "Tucson, alluvial valley soils"; *Thornber 2153*, 24 May 1904, "4 miles north of Tucson"; *Thornber s.n./ARIZ 61063*, 23 April 1905, Santa Cruz bottoms, Tucson.

LOASACEAE

Mentzelia multiflora (Nuttall) A. Gray
[*Mentzelia wrightii* A. Gray; Zones (II), III; herbs, C, B.] *Thornber s.n./ARIZ 115733*, 23 Aug 1901, "4 mi NW along S.P.R.R. track, Tucson"; *Thornber 5356*, 5 Oct 1913, Santa Cruz Valley.

MALVACEAE

β *Anoda cristata* (Linnaeus) Schlechtendal
[*Anoda cristata* (Linnaeus) Schlechtendal; Zone III; herbs, W, A.]

Eremalche exilis (A. Gray) Greene
[*Malvastrum exile* A. Gray; Zones II, (III); herbs, C, A.] *Thornber 2440*, 28 April 1903, Grosetta's Ranch, Tucson.

β † * *Malva parviflora* Linnaeus
[*Malva parviflora* Linnaeus; Zone M; herbs, C, A.]

Malvella sagittifolia (A. Gray) Fryxell
[*Sida lepidota* A. Gray var. *sagittifolia* A. Gray; Zone III; herbs, W, P.] *Thornber 4107*, 25 Aug 1901, "Santa Cruz valley, roadsides, NW Tucson"; *Thornber 54*, 24 Sept 1903, Santa Cruz Valley; *Thornber 453*, 25 May 1904, Santa Cruz river bottoms.

† *Rhyncosida physocalyx* (A. Gray) Fryxell
[*Sida physocalyx* (A. Gray) Fryxell; Zone III?; herbs, W, P.] This species was not listed by Thornber, 1909. *Thornber 4092*, 28 Aug 1901, Santa Cruz Valley, Tucson.

Sphaeralcea angustifolia (Cavanilles) G. Don var. *oblongifolia* (A. Gray) Shimmers [*Sphaeralcea cuspidata* (A. Gray) Britton; Zones (II), III; herbs, W, P.] *Shreve 7375*, 21 April 1935, St. Mary's Road, Tucson.

β *Sphaeralcea coulteri* (Watson) A. Gray
[*Sphaeralcea coulteri* (Watson) A. Gray; Zone III; herbs, C, A.]

† *Sphaeralcea laxa* Wootton & Standley
[*Sphaeralcea laxa* Wootton & Standley; Zone III?; herbs, W, P.] This species was not listed by Thornber, 1909. *Thornber 4109*, 23 August 1901, Santa Cruz Valley, 4 mi northwest of Tucson.

MARTYNIACEAE

† *Proboscidea parviflora* (Wootton) Wootton & Standley
[*Martynia* sp.; Zone III, listed by Thornber under "Long-lived Annuals"; herbs, W, A.] *Thornber s.n./ARIZ 143483*, 28 Aug 1901, Santa Cruz River, Tucson (as *M. fragrans* Lindley); *Thornber 5252*, 2 Sept 1903, Santa Cruz Valley, Tucson.

NYCTAGINACEAE

† *Boerhavia coccinea* Miller
[*Boerhavia viscosa* Lagasca var. *oligadena* Heimerl; Zone III; herbs, W, P.] *Thornber 5988*, Aug 1906, Santa Cruz bottoms, Santa Cruz River (as *Boerhaavia* sp.).

β *Boerhavia pterocarpa* S. Watson
[*Boerhavia pterocarpa* S. Watson; Zones II, (III); herbs, W, A.] All of the Tucson specimens at ARIZ were collected from the University of Arizona campus; there are none from the Santa Cruz Valley.

† *Boerhavia watsoni* Standley
[*Boerhavia watsoni* Standley; Zones II, (III); herbs, W, A.] *Thornber s.n./ARIZ 44887*, 28 Aug 1901, Santa Cruz Valley, Tucson.

OLEACEAE

Fraxinus velutina Torrey
[*Fraxinus velutina* Torrey; Zone III; trees, C, P.] *Thornber s.n./ARIZ 116393*, 27 Oct 1912, Santa Cruz bottoms, Tucson – "growing in the vicinity of Main street".

ONAGRACEAE

† *Gaura parviflora* Douglas
[*Gaura parviflora* Douglas; Zone M; herbs, C, A.] *Thornber 578*, 23 April 1903, Santa Cruz bottoms, Tucson; *Thornber s.n./ARIZ 113248*, 10 May 1913, Santa Cruz bottoms, Tucson; *Thornber 8143*, 15 April 1915, Santa Cruz bottoms, Tucson; *Shreve 7653*, 29 April 1936, "Santa Cruz flood plain near Tucson".

β *Oenothera rosea* Aiton
[*Oenothera rosea* Aiton; Zone IV; herbs, W, P.]

PAPAVERACEAE

Corydalis aurea Willdenow subsp. *occidentalis* (Engelmann) Ownbey [*Corydalis aurea* Willdenow var. *occidentalis* Engelmann; Zone III; herbs, C, A.] *Thornber s.n./ARIZ 30995*, 8 April 1903, Santa Cruz bottoms, Tucson; *Thornber s.n./ARIZ 31037*, 3 April 1905, Santa Cruz Valley – "in moist soil".

β *Platystemon californicus* Benth
[*Platystemon californicus* Benth; Zone III; herbs, C, A.]

PLANTAGINACEAE

- ♂ * *Plantago major* Linnaeus
[*Plantago major* Linnaeus; Zone M; herbs, C, A.]

POACEAE

- ♂ † * *Arundo donax* Linnaeus
[*Arundo donax* Linnaeus; Zone M; shrubs, W, P.]
- ♂ † * *Avena fatua* Linnaeus
[*Avena fatua* Linnaeus; Zone M; herbs, C, A.]
- ♂ † *Brachiaria fasciculata* (Swartz) Parodi
[*Panicum fuscum* Swartz; Zone III; herbs, W, A.] *Thornber* 152, 18 Sept 1903, "Tucson".
- ♂ † *Bromus carinatus* Hooker & Arnott
[*Bromus carinatus* Hooker & Arnott var. *arizonicus* Shear; Zone III; herbs, C, A.]
- † * *Bromus catharticus* Vahl
[*Bromus uniloides* (Willdenow) Kunth; Zone M; herbs, C, A.]
- * *Bromus diandrus* Roth
[*Bromus maximus* Desfontaines; Zone M; herbs, C, A.] *Thornber* 5521, 23 April 1903, Grosetta's Ranch, Tucson; *Thornber s.n./ARIZ 358134*, 10 May 1905, "cultivated lands, Tucson".
- † * *Bromus rubens* Linnaeus
[*Bromus rubens* Linnaeus; Zone M; herbs, C, A.] *C.E. Clarkson s.n./ARIZ 355492*, 7 May 1916, Santa Cruz River bottom.
- ♂ † *Chloris crinita* (Lagasca) Parodi
[*Trichloris fasciculata* Fournier; Zones (II), III; herbs, W, P.]
- ♂ * *Chloris virgata* Swartz
[*Chloris elegans* H.B.K.; Zones (II), III; herbs, W, A.]
- † * *Cynodon dactylon* (Linnaeus) Persoon
[*Cynodon dactylon* Linnaeus; Zone M; herbs, W, P.] *Toumey s.n./ARIZ 155053*, 2 July 1891, "along irrigating ditches, Tucson".
- ♂ * *Digitaria ciliaris* (Retz) Koeler
[*Digitaria sanguinalis* (Linnaeus) Scopoli; Zone M; herbs, W, A.]
- Distichlis spicata* (Linnaeus) Greene
[*Distichlis spicata* (Linnaeus) Greene; Zone III; herbs, W, P.] *D.Griffiths 1504*, 4 Sept 1900, "on alkaline bottoms near Tucson"; *Kleeberger s.n./ARIZ 128701*, September 1912, "common in alkaline soils, Santa Cruz Valley, Tucson, on Mr. Kleeberger's ranch"; *Thornber s.n./ARIZ 128696*, 27 Oct 1912, "alkaline areas, Tucson".

† * *Echinochloa colonum* (Linnaeus) Link
[*Echinochloa colonum* (Linnaeus) Link, including *Echinochloa colona* (Linnaeus) Link var. *zonale* Gussone, which had been listed separately in *Thornber's* 1909 publication; Zone M; herbs, W, A.] *Thornber s.n./ARIZ 241388*, 24 Aug 1901, "SW Tucson, near Indian Village"; *Thornber* 2547, 30 Oct 1902, Santa Cruz Valley, Tucson.

* *Echinochloa crus-galli* (Linnaeus) P. Beauvois
[*Echinochloa crus-galli* (Linnaeus) P. Beauvois; Zone M; herbs, W, A.] *D.Griffiths 1651* (or 1671?), Sept 1900, "Papago Reservation, Arizona" (only possibly from upstream).

♂ *Elymus triticoides* Buckley
[*Elymus triticoides* Buckley; Zone III; herbs, W, P.] *Thornber* made several collections of this grass at Ft. Lowell where he described it as "occasional in deep alluvial soils" (*Thornber s.n./ARIZ 222588*, 2 June 1903), however there are no collections of this species at ARIZ from the Santa Cruz Valley.

* *Eragrostis barrelieri* Daveau
[*Eragrostis pilosa* (Linnaeus) P. Beauvois; Zones (II), III; herbs, W, A.] *Thornber s.n./ARIZ 320586*, 3 August 1918, "City Library Park, Tucson".

† * *Eragrostis cilianensis* (Allioni) Vignolo-Lutati ex Janchen [Eragrostis megastachya (Koeler) Link.; Zone M; herbs, W, A.] *D.Griffiths 1653*, Sept 1900, "Papago Reservation, Arizona" (only possibly from upstream).

Eragrostis mexicana (Hornemann) Link
[*Eragrostis neomexicana* Vasey; Zones (II), III; herbs, W, A.] *Thornber 2631*, August 1903, Santa Cruz Valley, Tucson.

† *Eriochloa aristata* Vasey
[*Eriochloa punctata* (Linnaeus) W. Hamilton; Zone III; herbs, W, A.] *Thornber s.n./ARIZ 358133*, 24 Aug 1901, "6 mi SW of Tucson".

† * *Hordeum murinum* Linnaeus subsp. *glaucum* (Steudel) Tzvelev [Hordeum murinum Linnaeus; Zone M; herbs, C, A.] *Thornber s.n./ARIZ 116956*, 11 March 1902, Santa Cruz Valley, Tucson.

† *Hordeum pusillum* Nuttall
[*Hordeum pusillum* Nuttall; Zone III; herbs, C, A.] *Thornber s.n./ARIZ 116910*, 11 April 1903, Santa Cruz Valley, Tucson – "a common weed"; three collections in 1913 from "Santa Cruz bottom lands, Tucson"; *Thornber 8141* (15 April), *Thornber s.n./ARIZ 116909* (2 May), *Thornber 9178* (10 May).

† * *Hordeum vulgare* Linnaeus
[*Hordeum sativum* Jessen; Zones IV?, M?; herbs, C, A.] This species was not listed by *Thornber*, 1909. *Thornber*

5377, 6 May 1903, Santa Cruz bottoms, Tucson – “Growing in the river bed from seeds scattered. A much cultivated crop here.”

β * *Lamarckia aurea* (Linnaeus) Moench
[*Lamarckia aurea* (Linnaeus) Moench; Zone M; herbs, C, A.]

Leptochloa filiformis (Lamarck) P. Beauvois
[*Leptochloa filiformis* (Lamarck) P. Beauvois; Zone III; herbs, W, A.] *Thornber s.n./ARIZ 237382*, 24 Aug 1901, “SW Tucson, near Indian Village”; *Thornber s.n./ARIZ 152153*, 11 Oct 1902, “Tucson, common in cultivated lands”.

β ‡ *Leptochloa fusca* (Linnaeus) H.B.K. subsp. *uninervia* (Presl) N. Snow [*Leptochloa imbricata* Thurber; Zone III; herbs, W, A.] *Thornber s.n./ARIZ 114044*, 2 Aug 1905, Tucson – “Recently introduced!!”

‡ *Leptochloa viscida* (Scribner) Beal
[*Leptochloa viscida* (Scribner) Beal; Zone III; herbs, W, A.] *C.G. Pringle s.n./ARIZ 134975*, 17 June 1882 & 26 Oct 1882, “wet, clayey soil, valley of the Santa Cruz, Tucson”; *Thornber s.n./ARIZ 320320*, 3 Sept 1903, Santa Cruz Valley, Tucson – Type Locality Specimen; *Thornber 45*, 24 Sept 1903, Santa Cruz bottoms, Tucson.

* *Lolium temulentum* Linnaeus
[*Lolium temulentum* Linnaeus; Zone M; herbs, C, A.] *Thornber s.n./ARIZ 358135*, 10 May 1905, “cultivated lands, Tucson”.

β *Muhlenbergia porteri* Scribner
[*Muhlenbergia porteri* Scribner; Zones (I), II, (III); herbs, U, P.]

Panicum capillare Linnaeus
[*Panicum capillare* Linnaeus; Zone M; herbs, W, A.]
Thornber collected this at Ft. Lowell in 1903, but there are no collections at ARIZ from the Santa Cruz Valley. *P. capillare* var. *occidentale* was collected as a “weed in cultivated land, Tucson” in 1945 (*F.W. Gould 3187*), so possibly representing the floodplain s.l. These are native plants, despite Thornber’s placing them in his introduced species category.

Panicum obtusum H.B.K.
[*Panicum obtusum* H.B.K.; Zone III; herbs, W, P.] *Thornber 5364*, August 1903, Santa Cruz Valley “NW of Tucson”.

‡ *Panicum stramineum* Hitchcock & Chase
[*Panicum stramineum* Hitchcock & Chase; Zone III?; herbs, W, A.] This species was not listed by Thornber, 1909. *Thornber 219*, 2 Aug 1903, “4 mi NW of Tucson”; *Thornber s.n./ARIZ 164180*, 2 Sept 1903, “4 mi NW along railroad track”.

β ‡ *Pappophorum vaginatum* Buckley
[β *Paspalum distichum* Linnaeus]
[*Paspalum distichum* Linnaeus; Zone IV; herbs, W, P.]

‡ * *Phalaris caroliniana* Walter [*Phalaris caroliniana* Walter; Zone III; herbs, C, A.] *Thornber 5520*, 23 April 1903, Santa Cruz bottoms, Tucson.

* *Poa annua* Linnaeus
[*Poa annua* Linnaeus; Zone M; herbs, C, A.] *Thornber 789(?) / ARIZ 17168*, 11 April 1903, Santa Cruz River Valley, Tucson – “abundant along roadsides”.

‡ *Poa bigelovii* Vasey & Scribner
[*Poa bigelovii* Vasey & Scribner; Zone III; herbs, C, A.] *Thornber s.n./ARIZ 259488*, 11 April 1905, Santa Cruz River Valley, Tucson – “common”.

* *Polypogon monspeliensis* (Linnaeus) Desfontaines
[*Polypogon monspeliensis* (Linnaeus) Desfontaines; Zone III; herbs, C, A.] *D. Griffiths 2732*, 14 May 1901, Santa Cruz bottoms, Tucson; *Thornber s.n./ARIZ 155193*, 10 May 1913, Santa Cruz bottoms, Tucson.

* *Polypogon viridis* (Gouan) Breistroffer
[*Agrostis verticillata* Villars; Zone IV; herbs, W, P.] *Thornber s.n./ARIZ 19118*, 16 May 1913, Santa Cruz bottoms, Tucson – “occasional”.

‡ *Setaria macrostachya* H.B.K.
[*Setaria composita* H.B.K.; Zones (II), III; herbs, W, P.] *Thornber s.n./ARIZ 320325*, 8 June 1903, Santa Cruz Valley, Tucson.

β ‡ * *Sorghum halepense* (Linnaeus) Persoon
[*Sorghum halepense* (Linnaeus) Persoon; Zone M; herbs, W, A.]

‡ *Sporobolus airoides* (Torrey) Torrey
[*Sporobolus wrightii* Munro; Zone III; herbs, W, P.] *Thornber 2265*, 19 Aug 1904, Santa Cruz Valley, Tucson.

β * *Vulpia myuros* (Linnaeus) Gmelin
[*Festuca myuros* Linnaeus; Zone M; herbs, C, A.]

POLEMONIACEAE

* *Gilia capitata* Douglas var. *staminea* Greene
[*Gilia chamissonis* Greene; Zone M; herbs, C, A.] *Thornber s.n./ARIZ 27096*, 18 April 1903, “Santa Cruz Valley, Hartt’s Ranch”; *Thornber s.n./ARIZ 27095*, 2 May 1903, Santa Cruz bottoms, Tucson – “introduced”; *A. Conrad s.n./ARIZ 27099*, 1 May 1915, Santa Cruz Valley, Tucson (this is the most recent collection from Tucson at ARIZ).

POLYGONACEAE

* *Polygonum aviculare* Linnaeus
[*Polygonum aviculare* Linnaeus var. *littorale* (Link) Koch; Zone M; herbs, U, A.] *Thornber 202*, 9 Aug 1903, “4 miles NW of Tucson”.

* *Polygonum lapathifolium* Linnaeus

[*Polygonum lapathifolium* Linnaeus; Zone M; herbs, W, A.]
Thornber s.n./ARIZ 08950, 13 June 1913, Santa Cruz bottom lands.

† * *Rumex crispus* Linnaeus

[*Rumex crispus* Linnaeus; Zone M; herbs, C, A.] *Thornber s.n./ARIZ 43612*, 28 Aug 1901, Santa Cruz valley; *Thornber 2508*, 25 May 1903, "NW of Tucson"; *Thornber s.n./ARIZ 30639*, 10 May 1913, Santa Cruz valley.

β *Rumex hymenosepalus* Torrey

[*Rumex hymenosepalus* Torrey; Zones (II), III; herbs, C, P.]

Rumex violascens Rechner f.

[*Rumex berlandieri* Meisner; Zone III; herbs, C, P.]
Thornber 2510, 30 April 1904, Santa Cruz Valley, Tucson (as *Rumex* sp., annotated to *R. violascens* in 1951).

PORTULACACEAE

β * *Portulaca oleracea* Linnaeus

[*Portulaca oleracea* Linnaeus, Zone (II), III, M; herbs, W, A.; including *Portulaca retusa* Engelman, listed separately in Thornber's 1909 publication.]

POTOMOGETONACEAE

β *Potamogeton pusillus* Linnaeus

[*Potamogeton pusillus* Linnaeus; Zone IV; aquatic herbs, U, P.]

PRIMULACEAE

β *Androsace occidentalis* Pursh

[*Androsace occidentalis* Pursh; Zone III; herbs, C, A.]

Samolus parviflorus Rafinesque

[*Samolus floribundus* Kunth; Zone III; herbs, W, A.]
Thornber s.n./ARIZ 23261, 13 May 1904, Santa Cruz River Valley, Tucson.

RANUNCULACEAE

Clematis drummondii Torrey & A. Gray

[*Clematis ligusticifolia* Nuttall; Zone III; vines, W, P.] There are no Tucson collections of *C. ligusticifolia* by Thornber, however there are several of *C. drummondii* from the Santa Cruz Valley: *Thornber 4120*, 28 Aug 1901, Santa Cruz Valley, Tucson; *Thornber s.n./ARIZ 46355*, 12 May 1903, Santa Cruz Valley, Tucson; *Thornber s.n./ARIZ 322656*, 20 Aug 1905, Santa Cruz Valley, Tucson.

Myosurus cupulatus S. Watson

[*Myosurus cupulatus* S. Watson; Zone IV?; herbs, C, A.] This species was not listed by Thornber, 1909. *Thornber 4322*, 13 April 1903, Santa Cruz River banks, Tucson;

Thornber s.n./ARIZ 46648, 30 March 1913, Santa Cruz bottoms, Tucson.

Myosurus minimus Linnaeus

[*Myosurus minimus* Linnaeus; Zone III; herbs, C, A.]
Thornber 4321, 11 April 1903, Santa Cruz River banks, Tucson; *Thornber s.n./ARIZ 322660*, 11 April 1903, Santa Cruz River Valley, Tucson; *Thornber s.n./ARIZ 46664*, 2 May 1913, Santa Cruz bottom lands, Tucson.

RESEDACEAE

β † *Oligomeris linifolia* (Vahl) Macbride

[*Oligomeris glaucescens* Cambessedes; Zones (II), III; herbs, C, A.]

RHAMNACEAE

Condalia warnockii M. C. Johnston

[*Condalia spathulata* A. Gray; Zones (I), III; shrubs, W, P.] *L. Swingle S.314*, April 1916, flood plains, Santa Cruz Valley, Tucson.

β † *Zizyphus obtusifolia* (Hooker) A. Gray

[*Condalia lycioides* (A. Gray) Weberbauer; Zones II, (III); shrubs, W, P.]



Moth caterpillar (*Cargida pyrrha*) on *Zizyphus obtusifolia*

RUBIACEAE

Cephalanthus occidentalis Linnaeus var. *californicus* Benth [Cephalanthus occidentalis Linnaeus; Zone III; shrubs, W, P.] "Button Bush", "Snow Ball" Thornber s.n./ARIZ 79938, 20 Sept 1901, Santa Cruz River Valley, Tucson; Thornber 4868, 1 Oct 1909, Santa Cruz Valley, Tucson; Thornber s.n./ARIZ 79937, 13 June 1913, Santa Cruz River Valley, Tucson; L. Swingle S.286, June 1916, "floodplains, Santa Cruz River, Tucson"; Shreve s.n./ARIZ 79902, 12 Aug 1916, Santa Cruz bottoms.

SALICACEAE

Populus fremontii S. Watson subsp. *fremontii* [Populus fremontii S. Watson; Zone III; trees, C, P.] "Alamo" Thornber? s.n./ARIZ 40737, 9 Feb 1907, Santa Cruz bottoms; Thornber s.n./ARIZ 40726, 30 March 1913, Santa Cruz River bottoms, Tucson; Thornber 8085, 27 Feb 1915, Santa Cruz Valley, Tucson – "West Alameda Street, near Manning's"; R.J. Barr 64-569, 15 Oct 1964, Santa Cruz River in San Xavier Indian Reservation.

Salix exigua Nuttall

[Salix sp.; Zone III; trees, C, P.] Thornber s.n./ARIZ 05804, 30 March 1913, Santa Cruz bottoms; Thornber s.n./ARIZ 05807, 16 May 1913, Santa Cruz bottoms – "a common species in the river bed along sand bars"; Thornber 7380, 29 Sept 1913, Santa Cruz Valley – "common in the river bed and along the banks".

Salix gooddingii Ball

[Salix nigra Marsh; Zone III; trees, C, P.] Thornber s.n./ARIZ 05896, 23 April 1903, Santa Cruz Valley, Tucson.

SAPINDACEAE

Sapindus saponaria Linnaeus

[Sapindus drummondii Hooker & Arnott; Zone III; trees, W, P.] Thornber 4421, 7 Nov 1901, "Santa Cruz bottoms, foot of Tucson Mtns"; Thornber s.n./ARIZ 70889, 1 Nov 1902, "along Santa Cruz, Tucson"; Thornber 81, 31 Oct 1903, Santa Cruz River Valley, Tucson; Shreve s.n./ARIZ 79404, late summer 1908, Santa Cruz floodplain, Tucson.

SCROPHULARIACEAE

† *Maurandya antirrhiniflora* Humboldt & Bonpland

[Maurandya antirrhiniflora (Poir.) Willdenow; Zone III; herbs, W, P.] Thornber 476, 23 April 1903, Santa Cruz bottoms, Tucson; Thornber s.n./ARIZ 328219, 28 May 1904, Santa Cruz Valley near Tucson; Thornber 2473, 19 May 1905, Santa Cruz Valley, Tucson.

† *Penstemon parryi* A. Gray

[Penstemon parryi A. Gray; Zone III; herbs, C, P.] This species was not listed by Thornber, 1909.

*Maurandya antirrhiniflora*

Thornber 2474, 19 May 1905, Santa Cruz Valley; Mrs. W. Kitt s.n./ARIZ 64075, 20 April 1915, San Xavier Mission, Tucson – "flowers white".

‡ *Veronica peregrina* Linnaeus

[Veronica peregrina Linnaeus; Zone III; herbs, C, A.] Thornber 479, 11 April 1903, Santa Cruz River bottoms, Tucson; Thornber s.n./ARIZ 64438, 22 April 1903, Santa Cruz bottoms, Tucson; Thornber s.n./ARIZ 64432, 10 May 1913, Santa Cruz bottom land, Tucson; Shreve s.n./ARIZ 64413, March 1914, Santa Cruz flood plain, Tucson.

SOLANACEAE

* *Callibrachoa parviflora* (Jussieu) D'Arcy

[Petunia parviflora Jussieu; Zone III; herbs, U, A.] Thornber 4453, 28 Aug 1901, Santa Cruz Valley, Tucson; Thornber s.n./ARIZ 61439, 13 May 1904, Santa Cruz River, Tucson.

β *Chamaesaracha coronopus* (Dunal) A. Gray

[Chamaesaracha coronopus (Dunal) A. Gray; Zone III; herbs, W, P.]

Datura wrightii Regel

[Datura meteloides de Candolle; Zone III; herbs, W, P.] Thornber s.n./ARIZ 320334, 26 Aug 1903, Santa Cruz Valley, Tucson; Thornber 5, 20 Sept 1903, Santa Cruz bottoms; Thornber s.n./ARIZ 322650, 20 Aug 1905, Santa Cruz bottoms.

‡ *Lycium andersonii* A. Gray

[Lycium andersonii A. Gray var. *wrightii* A. Gray; Zone III; shrubs, U, P.] Thornber s.n./ARIZ 15306, 15 Aug 1901,

Santa Cruz River Valley, Tucson; *Thornber s.n./ARIZ 15281*, 1 Nov 1902, Santa Cruz bottoms, Tucson; *Thornber 33*, 24 Sept 1903, Santa Cruz River Valley, Tucson.

‡ *Lycium fremontii* A. Gray var. *fremontii*

[*Lycium fremontii* A. Gray var. *gracilipes* A. Gray; Zone III; shrubs, U, P.] *Thornber s.n./ARIZ 15325*, 2 Feb 1905, Santa Cruz River bottoms, Tucson.

β *Lycium torreyi* A. Gray

[*Lycium torreyi* A. Gray; Zones (II), III; shrubs, W, P.]

* *Nicotiana glauca* Graham

[*Nicotiana glauca* Graham; Zone M; shrubs, W, P.] *Thornber 480*, 13 May 1904, Santa Cruz bottoms, Tucson.

β ‡ *Nicotiana obtusifolia* Martens & Galeotti

[*Nicotiana trigonophylla* Dunal; Zones I, (III); herbs, U, P.]

‡ *Physalis acutifolia* (Miers) Sandwith

[*Physalis angulata* Linnaeus var. *linkiana* (Nees.) A. Gray; Zone III; herbs, W, A.] *Thornber 2020*, 27 Nov 1902, Santa Cruz Valley, Tucson – “a common weed”.



Bee on *Physalis acutifolia*

Physalis longifolia Nuttall

[*Physalis longifolia* Nuttall; Zone III; herbs, W, P.] *Thornber s.n./ARIZ 61785*, 5 Sept 1902, Santa Cruz bottoms, Tucson; *Thornber s.n./ARIZ 61742*, 28 Nov 1902, “rich valley soil, Tucson”.

Quincula lobata (Torrey) Rafinesque

[*Physalis lobata* Torrey; Zones II, (III); herbs, W, P.] *D.Griffiths 2173*, 25 Nov 1900, Santa Cruz bottoms, Tucson; *Thornber 4431*, 15 Nov 1901, Santa Cruz Valley, Tucson.

β *Solanum douglasii* Dunal

[*Solanum douglasii* Dunal; Zone III; herbs, W, P.]

‡ *Solanum elaeagnifolium* Cavanilles

[*Solanum elaeagnifolium* Cavanilles; Zones (II), III; herbs, W, P.] *Thornber s.n./ARIZ 320395*, 30 May 1903, Santa Cruz Valley, Tucson; *Thornber s.n./ARIZ 322653*, 20 Aug 1905, Santa Cruz bottoms, Tucson.

ULMACEAE

Celtis reticulata Torrey

[*Celtis mississippiensis* Bosc var. *reticulata* (Torrey) Sargent; Zone III; trees, C, P.] *Thornber 4768*, 28 Aug 1901, Santa Cruz Valley, Tucson; *Thornber 4422*, 7 Nov 1901, Santa Cruz Valley, Tucson; *Thornber s.n./ARIZ 44232*, 1 Nov 1902, “Palo Blanco – along Santa Cruz River”; *Thornber 2375*, 15 Nov 1902, Santa Cruz Valley, Tucson.

VERBENACEAE

β *Verbena neomexicana* (A. Gray) Small

[*Verbena canescens* Kunth; Zone III; herbs, U, P.]

VITACEAE

Parthenocissus vitacea (Kner) Hitchcock

[*Psedera vitacea* (Kner) Greene; Zone III; vines, W, P.] *Thornber 4425*, 7 Nov 1901, Santa Cruz Valley, Tucson.

β *Vitis arizonica* Engelm.

[*Vitis arizonica* Engelm.; Zone III; vines, W, P.]

ZANICHELLIACEAE

Zanichellia palustris S. Watson

[*Zanichellia palustris* Linnaeus; Zone IV; aquatic herbs, U, P.] *Thornber 5816*, 16 Oct 1906, Santa Cruz Valley, Tucson – “Manning’s irrigation ditch”; *D.Stults s.n./ARIZ 350182*, 11 Oct 1977, Kennedy Lake, Tucson, Pima Co.

ZYGOPHYLLACEAE

β *Kallstroemia californica* (S. Watson) Vail

[*Kallstroemia brachystylis* Vail; Zones II, (III); herbs, W, A.]

Kallstroemia grandiflora Torrey

[*Kallstroemia grandiflora* Torrey; Zones II, (III); herbs, W, A.] *Thornber s.n./ARIZ 322648*, 20 Aug 1905, Santa Cruz bottoms, Tucson; *Thornber 8154*, 12 Oct 1910, Santa Cruz Valley, Tucson.

β ‡ * *Tribulus terrestris* Linnaeus

[*Tribulus terrestris* Linnaeus; Zone M; herbs, W, A.]

II. Species collected in the Santa Cruz Valley after 1909 that were not in Thornber’s list and were not observed on the West Branch of the Santa Cruz in 2001:

ASTERACEAE

Machaeranthera tanacetifolia (H.B.K.) Nees

[*Machaeranthera tanacetifolia* (H.B.K.) Nees; Zone III?; herbs, W, P.] *Thornber* 5354, 5 Oct 1913, Santa Cruz bottoms, Tucson; *C.B. Carter s.n./ARIZ* 53268, 15 Oct 1932, "floodplain of Santa Cruz 5 mi south of Tucson" (this latter specimen was originally labeled as '*Aster "incanus"*').

CHENOPODIACEAE

* *Atriplex rosea* Linnaeus

[*Atriplex rosea* Linnaeus; Zone III?, IV?; herbs, W, A.] *Thornber* 4973, 28 July 1913, Santa Cruz River, Tucson – "not a common species".

MALVACEAE

Anoda pentaschista A. Gray

[*Sida angustifolia* Lamarck; Zone III?; herbs, W, A.] *Thornber s.n./ARIZ* 73517, 27 Oct 1912, Santa Cruz bottoms, Tucson – "not uncommon".

PAPAVERACEAE

Eschscholzia californica Chamisso subsp. *mexicana* (Greene) Clark [*Eschscholzia mexicana* Greene; Zone III; herbs, C, A.] *Shreve* 10104, 1 April 1941, Santa Cruz flood plain, Tucson.

POLYGONACEAE

* *Rumex conglomeratus* Murray

[*Rumex conglomeratus* Murray; Zone III?; herbs, W, A.] *Thornber s.n./ARIZ* 09091, May 1912, Santa Cruz bottoms, Tucson; *Thornber s.n./ARIZ* 09096, 16 May 1913, Santa Cruz bottoms, Tucson; *Thornber s.n./ARIZ* 09097, 15 June 1913, Santa Cruz bottom lands, Tucson.

SCROPHULARIACEAE

Mimulus guttatus de Candolle

[*Mimulus guttatus* de Candolle, Zone III? & IV?; herbs, C, P] *Thornber s.n./ARIZ* 63282, 16 May 1913, Santa Cruz bottoms, Tucson – "in bed of river, a common species".

III. Species omitted from the revised list and counts, for the reasons indicated:

ASTERACEAE

* *Machaeranthera incana* Greene

[*Aster incanus* (Lindley) A. Gray; Zone III; herbs, W, A.] This species occurs on the Pacific Slope from California to Canada, and is sometimes placed as a variety of *M. canescens* (see Hickman, 1950). There are no collections of this species from Arizona at ARIZ, however see the notes with *Machaeranthera tanacetifolia* in Section II.

BRASSICACEAE

Lepidium sp.

[*Lepidium* sp.; Zone III; herbs, C, A.] This may be *L. lasiocarpum*, as it was listed with cool-season annuals, however there are no specimens from the Santa Cruz Valley at ARIZ to support this presumption.

CHENOPODIACEAE

* *Atriplex texana* S. Watson

[*Atriplex texana* S. Watson; Zones II, (III); herbs, W, A.] This species occurs in Texas and Mexico and is not known from Arizona.

* *Atriplex serenana* A. Nelson

[*Atriplex bracteosa* Watson; Zone III; herbs, W, A.] This species occurs in California and Nevada and is not known from Arizona.

Atriplex sp.

[*Atriplex* sp.; Zone III; herbs, W, A.] *Thornber* listed this with long-lived annuals; it is possible that he was referring to *A. elegans* or *A. fasciculata*, for which there are many collections from the Santa Cruz Valley prior to 1909 (see Section I), or to *A. wrightii*. *Thornber* also collected the annual *Atriplex rosea* in the Santa Cruz Valley in 1913 (see Section II), and it is possible that he may have been referring to this, instead.

Suaeda suffrutescens S. Watson

[*Suaeda suffrutescens* S. Watson; Zone III; subshrubs, W, P.] This species occurs in Texas, Chihuahua, and neighboring Arizona at higher elevations, but probably did not occur in the vicinity of Tucson. There are no Tucson collections of this species at ARIZ.

Part 2. Plants of the West Branch of the Santa Cruz

There are currently 154 plant species in 38 families documented along the West Branch and its lower tributaries and floodplain between Silverlake Road and the Enchanted Hills Wash, east of Mission Road, in Tucson. Half of these species are held in common with those in *Thornber's* revised list (Part 1, Section I, above). Seventy-six percent of these plants (118 species) are native. Half of the non-native species are cool season annuals, ten are warm season annuals, and six are warm season perennials. There are two non-native stem succulents (*Opuntia microdasys* and *Opuntia ficus-indica*) growing as escapes from landscaping, and three non-native trees (*Rhus lancea*, *Morus alba*, *Tamarix aphylla*) growing rarely or occasionally along channels. Slightly more than half of the current flora (81 species) is comprised of annuals. Many winter annuals (n=37) were identifiable from standing dry plants, owing to the abundance, size, and fecundity of plants produced by the unusually wet "la nada" (neither El Niño nor La Niña) fall, win-

ter, and spring of 2000-2001. The winter flora compiled thus far, though it will benefit from a wetter winter in some future year, is dominated by annuals, while perennials comprise a narrow majority of the plants in the summer flora (Figure 2, p.34).

In the entries that follow, a diesis (§) indicates a plant that is also listed in Thornber's revised list for the Santa Cruz Valley in 1909 (n=76). An asterisk (*) indicates a non-native species (n=36). All references to prior collections in the Santa Cruz Valley refer to specimens at ARIZ, where collections by this author (numbers with prefix KM 21-) have also been deposited.

ACANTHACEAE

Carlowrightia arizonica A. Gray.

Perennial herbs, flowering in the summer and Fall. Scattered under the canopy of the mesquite forest along the West Branch channel. *Loomis, Peebles, Harrison & Fulton 1293*, 24 Mar 1926, Santa Cruz River bottoms near Tucson. *KM 21-032*

Dicliptera resupinata (Vahl) Jussieu.

Warm-season perennial herbs. Populations uncommon in the mesquite understory, but plants locally abundant. Corolla lobes dark pink, plants flowering in their first year. This species tends to favor mesic situations and has been collected several times from the Catalina foothills and canyons; it appears not to have been previously collected from the Santa Cruz Valley. *KM 21-135*

‡ *Ruellia nudiflora* (Engelmann & A. Gray) Urban.

Perennial herbs, flowering in the summer. Common, scattered all along the margins and sometimes in the channel of the West Branch, occasional on the floodplain under mesquite canopies. *Thornber 4942*, 23 Aug 1901, 4 mi NW of Tucson; *L. Swingle S.302*, July 1916, Santa Cruz floodplains; *D.McDowell s.n./ARIZ 30542*, 28 Nov 1936, irrigation ditch bank, Tucson. *KM 21-033*

AIZOACEAE

‡ *Trianthema portulacastrum* Linnaeus. Horse purselane. Warm season annuals. Common, scattered on the floodplain. *KM 21-104*

AMARANTHACEAE

Amaranthus obcordatus (A. Gray) Standley.

Warm-season annuals. Uncommon?, growing abundantly under a large, dying *Tamarix aphylla* near the Church Wash diversion, not seen elsewhere. Four other collections are at ARIZ, including three from Tucson; the most recent collection is dated 1931. *KM 21-116*



Ruellia nudiflora



Trianthema portulacastrum

‡ *Amaranthus palmeri* S. Watson. Pigweed.

Warm season annuals. Scattered on the floodplain and occasionally along or in the channel of the West Branch. *Thornber* 2543, 27 Oct 1902, Santa Cruz Valley, Tucson. *KM* 21-034

‡ *Tidestromia lanuginosa* (Nuttall) Standley.

Warm season annuals. Scattered on the floodplain west of the West Branch channel north of the Church Wash diversion. *KM* 21-097

ANACARDIACEAE

* *Rhus lancea* Linnaeus. African sumac.

Trees, flowering in the cool season. Uncommon, a few small individuals observed along the West Branch and the old Church Wash channel; one large individual is growing on the edge of the West Branch arroyo south of Silverlake Road. There are four specimens of this species from Tucson at ARIZ, the earliest dated 1969. *KM* 21-062

APIACEAE

Bowlesia incana Ruiz & Pavón.

Cool season annuals. Scattered along the wash margin. *KM*, observation, 8 February 2002

Daucus pusillus Michaux. Wild carrot.

Cool season annuals. Common, scattered or occasionally locally abundant along wash margins. *KM*, observation, 19 July 2001

ARISTOLOCHIACEAE

Aristolochia watsoni Wooton & Standley. Pipevine.

Perennial vines, flowering in the summer. Uncommon, growing on shrubs in the deep shade of the mesquite forest at the margin of the West Branch. Adult pipevine swallowtail butterflies (*Battus philenor*) were observed and their big, red caterpillars photographed in early August after the vine had made fruit and, in 6 days time, the several caterpillars had reduced it to just a few leaves. *KM* 21-077

ASCLEPIADACEAE

‡ *Sarcostemma cynanchoides* Decaisne subsp. *cynanchoides*. Climbing milkweed. Warm season vines, flowering in the summer. Scattered under the mesquite canopy and climbing into the trees and on other shrubs. Caterpillars of the queen butterfly (*Danaus gilippus*) were observed on a vine of this plant. *Thornber s.n./ARIZ* 98920, 23 Aug 1901, 4 mi NW of Tucson; *Thornber* 2556, 27 Oct 1902, Santa Cruz Valley, Tucson; *Thornber* 709, 23 Aug 1904, Santa Cruz River Valley, Tucson; *Thornber s.n./ARIZ* 322651, 20 Aug 1905, Santa Cruz bottoms. *KM* 21-035

ASTERACEAE

‡ *Ambrosia confertiflora* de Candolle. Slimleaf bursage. Perennial herbs, flowering in the summer. Plants scattered along the West Branch channel, occasionally occurring in small populations. A beetle in the Chrysomelidae was observed on the inflorescence of one plant. *Thornber* 2549, 27 Oct 1902, Santa Cruz Valley, Tucson; *Thornber* 41, 24 Sept 1903, Santa Cruz bottoms, Tucson; *Thornber s.n./ARIZ* 56978, 24 Sept 1903, Santa Cruz flood plains, Tucson – “common”. *KM* 21-083



Queen caterpillar (*Danaus gilippus*) on *Sarcostemma cynanchoides*



Pipevine swallowtail (*Battus philenor*) caterpillar on *Aristolochia watsoni*

Ambrosia cordifolia (A. Gray) Payne. Sonoran bursage. Subshrubs, flowering in the spring. Uncommon, a few large individuals observed under the canopy of the mesquite forest along the West Branch. The type locality for the species is "rocky slopes, Tucson Mountains, due west of Tucson" (Shreve 10207) and there are several collections by Thornber in the Tucson Mountains, yet there are no prior records of this species from the Santa Cruz Valley. *KM 21-063*

Baccharis sarothroides A. Gray. Desert broom. Shrubs, flowering in the warm season. Scattered along the West Branch channel and occasional on the floodplain. *KM*, observation, 12 July 2001

Baileya multiradiata Harvey & A. Gray. Desert marigold. Perennial herbs, flowering in spring and summer. Uncommon, scattered on coarse fill, not observed on the floodplain. *KM*, observation, 8 August 2001

Brickellia coulteri A. Gray. Brickelbush. Subshrubs, flowering in cooler weather. Plants uncommon, scattered under the mesquite canopy along the West Branch. *KM 21-036*

‡ * *Centaurea melitensis* Linnaeus. Malta starthistle. Cool season annuals. Scattered on the floodplain and along wash channels. *KM*, observation, 19 July 2001

* *Conyza bonariensis* (Linnaeus) Cronquist. Warm season annuals. Uncommon, a few plants observed widely scattered on the floodplain near the Church Wash diversion. There are five collections of this species at ARIZ, three of which are from Tucson. Thornber noted on one specimen in 1913, "streets, Tucson – species not abundant" (Thornber s.n./ARIZ 59446). *KM 21-037*

‡ *Conyza canadensis* (Linnaeus) Cronquist. Horseweed. Warm season annuals. Common, scattered on the floodplain. Thornber s.n./ARIZ 56060, 25 Oct 1902, Valley Santa Cruz, Tucson. *KM 21-070*

‡ *Conyza coulteri* A. Gray. Warm season annuals. Common, scattered on the floodplain and occasional along the margin of the West Branch. *KM 21-100*

‡ *Erigeron divergens* Torrey & A. Gray. Fleabane. Warm season annuals. Common, scattered along wash margins, occasional under the mesquite canopy or on the floodplain. There are several early collections from Tucson; the following may be from the floodplain s.l.: Thornber 439, 25 May 1903, "northwest of Tucson". *KM 21-038*

‡ *Gutierrezia microcephala* (de Candolle) A. Gray. Subshrubs, flowering in late summer. Uncommon?, scattered in the Enchanted Hills Wash distributary and West Branch floodplain. *KM 21-141*

‡ *Hymenoxys wislizeni* A. Gray. Summer biennials or perennials. The numerous heads were observed covered with small, brown weevils just as the ray flowers were emerging in early September. Common on the banks of the West Branch. *KM 21-121a*

‡ *Isocoma coronopifolia* (A. Gray) Greene. Burrow weed. Subshrubs, flowering in the warm season. Scattered on coarse fill dirt, not observed on the floodplain. There are several Tucson collections by Thornber, including in the Tucson Mountains where he called it "a common weed" in 1903, however there are no collections from the Santa Cruz Valley. *KM 21-127*

‡ *Iva ambrosiaefolia* A. Gray. Late summer annuals. Plants seemingly uncommon, scattered in the understory fringe of the floodplain. These resemble, somewhat, *Ambrosia confertiflora* and may be easily overlooked. Thornber collected this species (as *Gaertneria* sp.) at Martinez Ranch "12 miles south of Tucson" on 13 September 1903 (Thornber 125). *KM 21-143*

* *Lactuca seriola* Linnaeus. Prickly lettuce. Cool season annuals or persisting feebly into the summer. Scattered on the floodplain, occasional on wash margins and under the mesquite canopy. Thornber noted this species on the "streets of Tucson" in 1938 and it was described as a "weed in cultivated areas" in Tucson in 1945 (F.W.Gould 3179). *KM 21-064*

‡ *Machaeranthera coulteri* (A. Gray) Turner & Horne var. *arida* (Turner & Horne) Turner. Annual or perennial herbs, flowering in summer or non-seasonal. Uncommon?, a few plants growing on the floodplain. Thornber s.n./ARIZ 30648, 23 Aug 1901, "NW Tucson, in alkali beds"; Thornber 2475, 24 May 1905, Santa Cruz Valley, Tucson – "in alkaline soil" (this specimen as *Machaeranthera* sp.). *KM 21-082*

Machaeranthera tagetina Greene. Annuals, biennials, or short-lived perennials flowering in the summer. Uncommon, scattered on the Church Wash diversion and banks of the West Branch. There are early collections of this species from "Tucson" in 1903 (Thornber s.n./ARIZ 53216), and in 1916 "near Tucson" (Shreve 4900, as *M. tanacetifolia*); there are no collections of this species from the Santa Cruz Valley (however, see *M. tanacetifolia* in Part I, Section II). *KM 21-123*

Porophyllum gracile Benth. Odora. Perennial herbs, flowering in spring and fall with rain. Uncommon, scattered on the margins of the West Branch in the shade of the mesquite forest. *KM*, observation, 3 Sept 2001

Psilostrophe cooperi (A. Gray) Greene. Paper flower. Perennial herbs, flowering in warmer weather. Uncommon?, one small plant observed on the floodplain. *KM*, observation, 21 July 2001



Machaeranthera tagentina

† * *Sonchus oleraceus* Linnaeus. Sow thistle.
Cool season annuals. Scattered along washes, under the mesquite canopy, and occasionally on the floodplain. *Thorner s.n./ARIZ 60053*, 28 Aug 1901, Valley Santa Cruz, Tucson; *Thorner s.n./ARIZ 187949*, 23 April 1903, Santa Cruz bottoms, Tucson; *Thorner 466*, 30 May 1903, Santa Cruz bottoms, Tucson; *Thorner s.n./ARIZ 60046*, 16 May 1913, Santa Cruz bottoms, Tucson. *KM*, observation, 21 July 2001

Stephanomeria pauciflora A. Gray. Wire lettuce.
Perennial herbs, flowering in the warm season. Uncommon, growing under the mesquite canopy along the West Branch. *KM 21-078*

‡ *Verbesina encelioides* (Cavanilles) A. Gray.
Cowpen daisy. Warm season annuals. Scattered along the margin of the West Branch and occasional on the floodplain. *KM 21-058*

† * *Xanthium strumarium* Linnaeus. Cocklebur.
Warm-season annuals. A single plant observed in the West Branch channel near Silverlake Road (the plant is more common on the Santa Cruz channel). *Thorner 8*, 20 Sept 1903, Santa Cruz Valley, Tucson. *KM*, observation, 10 Sept 2001

BORAGINACEAE

Lappula occidentalis (S. Watson) Greene. Stickseed.
Cool season annuals. Scattered along wash margins and occasional on the floodplain. The fruits are notorious for tangling with sheep's wool (Beryl Baker, personal commu-

nication). *Shreve 10083*, 28 March 1941, Santa Cruz flood plain, Tucson; *A.S.Barclay 2047*, 24 April 1965, upper floodplain of Santa Cruz River, Tucson. *KM*, observation, 21 July 2001

BRASSICACEAE

* *Brassica tournefortii* Gouan. Sahara mustard.
Cool season annuals. Scattered on disturbed ground and fill dirt, populations apparently localized. Observed as dry plants and tumbleweeds. *KM*, observation, 8 August 2001

Caulanthus lasiophyllus (Hooker & Arnott) Payson.
Cool season annuals. Scattered along the banks of the West Branch. *KM*, observation, 21 July 2001.

‡ *Descurainia pinnata* (Walter) Britton. Tansy mustard.
Cool season annuals. Scattered along the banks of the West Branch. *Thorner s.n./ARIZ 47772*, 2 May 1913, Santa Cruz bottom lands, Tucson. *KM*, observation, 19 July 2001

Lepidium lasiocarpum Nuttall.
Cool season annuals. Scattered along the banks of the West Branch. *KM*, observation, 21 July 2001.

Lesquerella gordonii (A. Gray) S. Watson. Bladderpod.
Cool season annuals. Uncommon?, scattered along the banks of the West Branch. *KM*, observation, 21 July 2001

† * *Matthiola longipetala* (Ventenat) de Candolle. Evening stock. Cool season annuals. Scattered on disturbed ground and fill dirt, populations apparently localized. Observed as dry plants and tumbleweeds. *E.M.Porter s.n./ARIZ 180494*, 15 April 1971, "in sandy soil in Santa Cruz River bottom, 1 mi west of Cortaro"; *C.Monson s.n./ARIZ 238765*, 8 Feb 1983, "Santa Cruz River at El Camino del Cerro". *KM*, observation, 8 August 2001

* *Sisymbrium irio* Linnaeus. London rocket.
Cool season annuals. Common, abundant on the floodplain. *Thorner* observed this species and noted, "freight depot, Tucson – a recently introduced species" in February 1915 (*Thorner 7030*); *Shreve* remarked in April 1941, "very abundant annual in waste places, Tucson" (*Shreve 10194*). *KM*, observation, 12 July 2001

CACTACEAE

No cactus species are listed for the Santa Cruz floodplain in *Thorner* (1909).

Cylindropuntia arbuscula Engelmann. Pencil cholla.
Stem succulents, flowering in the spring. One plant observed under a mesquite on a cutbank of the West Branch. *KM*, observation, 18 August 2001

Cylindropuntia leptocaulis de Candolle. Christmas cholla. Stem succulent, flowering in warmer weather. Scattered, growing under shrubs or trees, occasionally in the open on the floodplain. *KM*, observation, 21 July 2001

Cylindropuntia spinosior (Engelmann) Toumey. Cane cholla. Stem succulents, flowering in late spring. Uncommon, but locally abundant where these occur on the floodplain. *Van Devender 90-29/M.A. Baker 7807*, 15 April & 5 May 1990, Santa Cruz River floodplain. *KM 21-095*

* *Opuntia ficus-indica* (Linnaeus) Miller. Nopal. Stem succulents, flowering in spring. A few plants observed widely scattered along the West Branch channel, escaped from landscaping. *KM*, observation, 18 August 2001.

* *Opuntia microdasys* (Lehmann) Lehmann. Bunny ears cactus. Stem succulents, flowering in the spring. A small cluster of plants, probably escaped from neighboring landscaping, on the bank of the West Branch. *KM*, observation, 10 August 2001

Opuntia phaeacantha Engelmann. Prickly pear. Stem succulents, flowering in late spring. Uncommon, widely scattered on the floodplain and on the banks of the West Branch. *KM 21-096*

CAPPARACEAE

‡ *Polanisia trachysperma* Torrey & A. Gray. Western clammyweed. Warm season annuals. Uncommon, scattered on the floodplain, occasionally in the wash channel where individuals may become rather large. *Thorner 4115*, 21 Sept 1901, Santa Cruz bottoms, Tucson; *Thorner s.n./ARIZ 48845*, 28 July 1913, Santa Cruz River, Tucson – “not a common species”. *KM 21-039*

CARYOPHYLLACEAE

Silene antirrhina Linnaeus. Sleepy catchfly. Cool season annuals. Locally common along the margins of the West Branch and Church Wash diversion. *KM*, observation, 19 July 2001

CHENOPODIACEAE

‡ *Atriplex canescens* (Pursh) Nuttall. Four-wing saltbush. Shrubs, fruiting in the warm season. Plants not common, widely scattered along the edges of the floodplain. *Thorner s.n./ARIZ 43835*, 2 Sept 1901 & 12 Oct 1901, “Tucson, Santa Cruz Val.”; *Thorner 111*, 3 Oct 1903, 4 mi NW Tucson. *KM 21-059*

Atriplex elegans (Moquin) Dietrich subsp. *elegans*. Wheelscale. Non-seasonal annuals. Common on the floodplain, observed parasitized by *Cuscuta umbellata* (Convolvulaceae). *Thorner* collected several specimens

of this species, but these have been revised to *A. fasciculata* S. Watson = *A. elegans* subsp. *fasciculata* (S. Watson) Hall & Clements in the collections at ARIZ (see Part 1, Section I). *KM 21-060*

‡ *Atriplex linearis* S. Watson. Narrow-leaf saltbush. Shrubs or subshrubs, fruiting in the summer. Locally common on undisturbed flats bordering the old Church Wash channel on the west, populations very localized. *Thorner s.n./ARIZ 43896*, 23 Aug 1901, 4 mi. NW of Tucson, Santa Cruz River Valley; *Thorner 110a*, 3 Sept 1903, 4 mi. NW of Tucson. *KM 21-126*

‡ *Atriplex polycarpa* (Torrey) S. Watson. Allscale. Shrubs, fruiting in the summer. Scattered on the floodplain and on drier wash margins. *Thorner 109a*, 3 Sept 1903, 4 mi NW Tucson – “flowers”; *Thorner 109*, 3 Oct 1903, 4 mi NW Tucson – “fruits”. *KM 21-061*

Atriplex wrightii S. Watson. Summer annuals. Common, locally abundant on the floodplain and along the Church Wash diversion. *C.B. Carter s.n./ARIZ 44004*, 1 Oct 1933, “St. Mary’s Road, Tucson – ditches, banks with *Gaertneria* and *Amaranthus palmeri*”. *KM 21-040*

Chenopodium neomexicanum Standley. Warm season annuals. Scattered along the banks and in the channel of the West Branch; fruiting plants with a strong odor of dead fish. *Thorner s.n./ARIZ 44055*, July 1913, “cultivated lands, Santa Cruz River Valley, Tucson, nearby San Xavier Indian Reservation”. *KM 21-041*, 21-090

* *Salsola tragus* Linnaeus. Russian thistle. Warm season annuals. Common on the floodplain, observed parasitized by *Cuscuta umbellata* (Convolvulaceae). *Thorner 7305*, 27 July 1913, “5 mi northwest of Tucson in alkaline soil along the S.P.R.R.” (as *S. pestifer*). *KM*, observation, 19 July 2001

‡ *Suaeda torreyana* S. Watson. Desert seepweed, quelite. Semi-succulent shrubs, flowering in summer. Uncommon, scattered on the Church Wash diversion and the old Church Wash channel. *Thorner s.n./ARIZ 44375*, 23 Aug 1901, “5 mi NW of Tucson”; *Thorner s.n./ARIZ 44382*, 3 Oct 1903, Santa Cruz floodplains. *KM 21-114*

CONVOLVULACEAE

Cuscuta umbellata H.B.K. Dodder. Parasitic herbs on summer annuals, emerging late in the monsoon season. Growing on *Salsola tragus* and *Atriplex elegans* on the floodplain near the Church Wash diversion. *KM 21-136*

‡ *Ipomoea hederacea* Jacquin. Ivy-leaf morning glory. Warm season annual vines. Common, scattered all along the West Branch channel and margins. *Thorner 5513*, 23 Sept 1910, Santa Cruz River Valley, Tucson. *KM 21-120a*



Ipomoea hederacea

CUCURBITACEAE

‡ *Cucurbita digitata* A. Gray. Coyote gourd. Perennial vines flowering in the summer. Uncommon, widely scattered on the wash margin and under (or within) the mesquite canopy along the West Branch. A large, native bee was observed inside of flowers of the male vine early in the morning in late summer. *Thorner 24*, 22 Sept 1903, Santa Cruz Valley, Tucson. *KM 21-134*



Cucurbita digitata (female)



Cucurbita digitata (male)

EUPHORBIACEAE

Euphorbia abramsiana Wheeler.

Warm-season annuals. Common, growing commonly on fill and floodplain areas. *KM 21-117*

Euphorbia capitellata Engelm.

Perennial herbs, flowering in the warm season. Uncommon?, growing on the margin of the West Branch channel. There are several early collections of this species from the Tucson Mountains and Tumamoc Hill; it was collected and described in July 1953 as "a weed at edge of irrigated field, 5 miles west of Tucson, 2450 ft elev" (*K.F.Parker 8301*). *KM 21-079*

‡ *Euphorbia heterophylla* Linnaeus. Painted spurge, desert poinsettia. Late summer annuals. Common, growing scattered along the banks and edges of wash channels. A small, orange fly was observed at the gland on these plants in flower. *Thorner 5987*, Aug 1907, Santa Cruz bottoms, Santa Cruz River, Tucson. *KM 21-105*

‡ *Euphorbia hyssopifolia* Linnaeus.

Warm season annuals. Common, scattered along the margins of the West Branch. A small beetle was observed on the cyathia of these plants. *Thorner 2545*, 30 Oct 1902, Santa Cruz Valley, Tucson; *Thorner 5989*, 1 Aug 1906, Santa Cruz bottoms, Santa Cruz River, Tucson. *KM 21-110*

Euphorbia pediculifera Engelm.

Non-seasonal, short-lived perennial herbs. Growing scattered on shaded banks of the West Branch. *KM 21-139*

*Euphorbia capitellata**Euphorbia hyssopifolia*

FABACEAE

‡ *Acacia greggii* A. Gray. Catclaw acacia. Shrubs (or small trees), flowering in the cool season. Common but not abundant, scattered along the West Branch. *Thornber s.n./ARIZ 322589*, 28 Aug 1901, Tucson (this specimen was collected on the same date as a specimen of *A. angustissima*, which Thornber noted from "Santa Cruz bottoms"). *KM*, observation, 12 July 2001

* *Medicago sativa* Linnaeus. Alfalfa. Non-seasonal perennial herbs. Uncommon, widely scattered along the Church Wash diversion and the West Branch amid Bermuda grass. *KM 21-099*

‡ * *Melilotus indicus* (Linnaeus) Allioni. Yellow sweet clover. Cool season annuals. Uncommon?, scattered along the margins of the West Branch. *KM*, observation, 21 July 2001

Parkinsonia aculeata Linnaeus. Mexican palo verde. Trees, flowering in warmer weather. Common, scattered along the margins of the West Branch. The earliest collection of this species in Tucson is 14 May 1941 (*L.Benson 10986*); there are no collections explicitly from the Santa Cruz Valley. *KM 21-094*

Parkinsonia florida (Benth) S. Watson. Blue palo verde. Trees, flowering in late spring. Uncommon?, scattered along the margins of the West Branch. *KM*, observation, 12 July 2001

Prosopis glandulosa Torrey var. *glandulosa*. Honey mesquite. A few trees are planted along the Church Wash diversion. *KM 21-044*

‡ *Prosopis velutina* Wooton. Velvet mesquite. Trees, flowering in the spring. Common, trees to several meters tall form a dense bosque along much of the West Branch; smaller trees (shrubs) are scattered on the floodplain. *KM*, observation, 12 July 2001

*Euphorbia heterophylla*

HYDROPHYLLOIDACEAE

Phacelia ambigua M. E. Jones. Caterpillar plant.
Cool season annuals. Scattered on the margins of the West Branch. *KM*, observation, 21 July 2001

KOEBERLINIACEAE

† *Koeberlinia spinosa* Zuccarini. All-thorn.
Shrubs, flowering in summer and a favorite of bees. Uncommon, widely scattered at the edges of the floodplain. *KM*, observation, 12 July 2001

LAMIACEAE

Salvia columbariae Benth. Chia.
Cool season annuals. Uncommon?, observed as a single cluster of dry plants on the floodplain. *KM*, observation, 19 July 2001

MALVACEAE

Abutilon incanum (Link) Sweet. Indian mallow.
Perennial herbs, flowering in warmer weather. Uncommon, growing on the banks of the West Branch. Corollas yellow-orange. *KM 21-111*

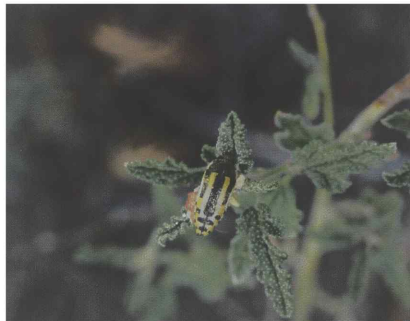
† * *Malva parviflora* Linnaeus. Cheeseweed.
Non-seasonal annuals. Uncommon?, scattered in the mesquite forest, along wash margins, and at the toad pond on the old Church Wash. *KM*, observation, 29 July 2001

† *Rhyncosida physocalyx* (A. Gray) Fryxell.
Perennial herbs flowering in the warm season. Common, scattered in the mesquite forest and on the margins of the West Branch, very occasional on the floodplain. Corollas pale orange to whitish. *Thornber 4092*, 28 Aug 1901, Santa Cruz Valley, Tucson. *KM 21-045*



Rhyncosida physocalyx

† *Sphaeralcea laxa* Wootton & Standley. Caliche globe mallow. Perennial herbs or shrubby, flowering in the summer. Scattered along the banks of the West Branch and on the floodplain. Corollas deep orange; a beetle in the Buprestidae was observed on a flower of one plant. *Thornber 4109*, 23 August 1901, Santa Cruz Valley "4 mi. northwest of Tucson". *KM 21-071*



A Buprestid on *Sphaeralcea laxa*

MARTYNIACEAE

† *Proboscidea parviflora* (Wootton) Wootton & Standley. Devil's claw. Warm-season annuals. Common, scattered on the floodplain, and generally a species of well-watered sites and fine soils. Corollas rose-pink and white. *Thornber s.n./ARIZ 143483*, 28 Aug 1901, Santa Cruz River, Tucson (as *M. fragrans* Lindley); *Thornber 5252*, 2 Sept 1903, Santa Cruz Valley, Tucson; *Thornber 3*, 10 Sept 1903, "Tucson". *KM 21-106*

MORACEAE

* *Morus alba* Linnaeus. Mulberry.
Trees, flowering in spring. One, apparently uncultivated individual is growing along the old Church Wash channel. There are no specimens for this species for uncultivated plants in the Santa Cruz Valley. *KM 21-072*

NYCTAGINACEAE

Allionia incarnata Linnaeus. Trailing four-o'clock.
Perennial herbs, flowering year-round. Uncommon?, one plant observed on the bank of the West Branch. There are many Tucson collections of this species; the following is from upstream: *Wiggins & Rollins 48*, 23 Aug 1941, "4 miles south of Mission San Xavier" (with *Boerhavia erecta*, below). *KM 21-085*

† *Boerhavia coccinea* Miller. Red spiderling.
Perennial herbs, flowering in warmer weather. Scattered on the banks of the West Branch. *Thornber 5988*, Aug 1906,

Santa Cruz bottoms, Santa Cruz River (as *Boerhaavia* sp.).
KM 21-084

Boerhavia erecta Linnaeus. Spiderling.

Warm-season annuals. Common, growing widespread on the floodplain. Thornber collected this species at San Xavier, 20 July 1913 (*Thornber s.n./ARIZ 44982*); it was collected 4 miles south of there on 23 Aug 1941 (*Wiggins & Rollins 52*). *KM 21-091*

‡ *Boerhavia watsoni* Standley. Spiderling.

Summer annuals. Plants common, scattered on the floodplain. Flowers white. *Thornber s.n./ARIZ 44887*, 28 Aug 1901, Santa Cruz Valley, Tucson. *KM 21-109*

Commicarpus scandens (Linnaeus) Standley.

Bush spiderling. Perennial herbs, flowering in the summer. Scattered under shrubs on the floodplain and in the mesquite forest. There are a few Tucson collections of this species, none from the Santa Cruz Valley. Thornber remarked of this plant, "mesas, Tucson, in arroyo—a very peculiar species" (*Thornber s.n./ARIZ 320317*, 25 Sept 1910). *KM 21-123A*

ONAGRACEAE

Camissonia californica (Nuttall) P. Raven.

Cool season annuals. Scattered along the margins of the West Branch. *KM 21-066*

Camissonia chamaenerioides A. Gray.

Cool season annuals. Uncommon?, scattered along the margins of the West Branch. *KM 21-080*

‡ *Gaura parviflora* Douglas. Lizard tail.

Cool-season annuals. Scattered along the margins of the West Branch, occasionally straggling up into lower tree branches in the mesquite forest. *Thornber 578*, 23 April 1903, Santa Cruz bottoms, Tucson; *Thornber s.n./ARIZ 113248*, Santa Cruz bottoms, Tucson; *Thornber 8143*, 15 April 1915, Santa Cruz bottoms, Tucson; *Shreve 7653*, 29 April 1936, "Santa Cruz flood plain near Tucson". *KM*, observation, 13 August 2001

PLANTAGINACEAE

Plantago ovata Forsskal. Indian wheat.

Cool season annuals. Scattered on the floodplain. Thornber's early collections of this species in Tucson are from the Tucson Mountains and Tumamoc Hill. The following may be from the floodplain s.l.: *McLaughlin 2442*, 25 March 1980, "Silverbell Road just west of Santa Cruz wash at north end of Tucson Mountains". *KM*, observation, 21 July 2001

Plantago patagonica Jacquin. Pursch plantain.

Cool season annuals. Scattered on the floodplain and the margins of the West Branch. *KM*, observation, 21 July 2001

POACEAE

Aristida purpurea Nuttall var. *longiseta* Vasey.

Perennials, flowering in the summer. Uncommon?, a few bunches observed on the bank of the West Branch arroyo. *KM 21-089*

Aristida purpurea Nuttall var. *nealleyi* (Vasey) Allred.

Perennials, flowering in the summer. Locally common, growing in coarse soil on the floodplain. *KM 21-048*



Proboscidea paviflora



View of floodplain toward downtown West Branch of the Santa Cruz, Tucson. July 2001



Mesquite overhanging the West Branch channel. Aug 2001



Pool in the West Branch channel. July 2001.

Aristida ternipes Cavanilles var. *gentilis* (Henrard) Allred. Three-awned spider grass. Perennials, flowering in the summer. Scattered, growing on the margins of washes. *KM 21-049*

Aristida ternipes Cavanilles var. *ternipes*. Spider grass. Perennials, flowering in the summer. Uncommon?, scattered on coarse fill. *KM 21-118*

‡ * *Arundo donax* Linnaeus. Giant-reed. Perennials; tall, woody grass flowering in late summer-fall. One clump south of Silverlake Road. *KM*, observation, 24 August 2001

‡ * *Avena fatua* Linnaeus. Wild oat. Cool season annuals. Widely scattered, growing on the margins of washes. *KM*, observation, 8 August 2001

Bouteloua aristoides (H.B.K.) Griesbach. Needle grama. Summer annuals. Growing scattered on coarse fill dirt near Silverlake and Mission Roads. *KM*, observation, 10 Sept 2001

Bouteloua rothrockii Vasey. Rothrock grama. Short-lived perennials, flowering in the summer. Scattered, growing on coarse fill. *KM 21-113*

Brachiaria arizonica (Scribner & Merrill) Blake. Arizona panic grass. Warm-season annuals. Uncommon?, growing in gravel in the West Branch channel, scattered on the floodplain and on fill. Closely resembles *B. fasciculata* (below), but with the fertile lemma smooth and shiny rather than rugose. Thornber noted of this species in 1903, "mesas – a common species"; there are no collections at ARIZ from the Santa Cruz Valley. *KM 21-108*

‡ *Brachiaria fasciculata* (Swartz) Parodi. Summer annuals. Plants locally common along the old Church Wash channel, not seen elsewhere. *Thornber 152*, 28 Sept 1903, "Tucson" (as *Panicum fuscum* Swartz). *KM 21-120*

‡ *Bromus carinatus* Hooker & Arnott. Arizona brome. Cool season annuals. Scattered in the understory of the mesquite forest along the West Branch and the old Church Wash. *KM 21-073*

‡ * *Bromus catharticus* Vahl. Cool season annuals. Scattered in the understory of the mesquite forest along the West Branch and the old Church Wash. *KM 21-050*

‡ * *Bromus rubens* Linnaeus. Red brome. Cool season annuals. Uncommon?, plants widely scattered near the Church Wash diversion and on the old Church Wash. *C.E. Clarkson s.n./ARIZ 355492*, 7 May 1916, Santa Cruz River bottom. *KM*, observation, 29 July 2001

‡ *Chloris crinita* (Lagasca) Parodi. Feather fingergrass.

Perennials, flowering in the summer. Common, large clumps scattered on the floodplain. *KM 21-074*

‡ * *Cynodon dactylon* Linnaeus. Bermuda grass. Perennials, flowering in spring and summer. Ubiquitous along wash margins. *Toumey s.n./ARIZ 155053*, 2 July 1891, "along irrigating ditches, Tucson". *KM*, observation, 12 July 2001

* *Dactyloctenium aegyptium* (Linnaeus) Richter. Crowfoot grass. Warm-season annuals. Growing abundantly along parts of the Church Wash diversion. The earliest collection of this species from Tucson is a cultivated specimen in 1892 (*Toumey s.n./ARIZ 300887*). Several early collections from Tucson exist; Thornber remarked in 1912, "roadsides, not uncommon about Tucson, Arizona, where it is rapidly spreading" (*Thornber s.n./ARIZ 300885*). There are no collections at ARIZ explicitly from the Santa Cruz Valley. *KM 21-119*

Digitaria insularis (Linnaeus) Mez ex Eckman. Sourgrass. Perennials, flowering in late summer. Uncommon?, growing on the floodplain near to the mesquite forest. Several cultivated specimens were prepared for ARIZ by the Soil Conservation Service (E.W. Hardies in 1936 and 1937, and A.G. Hess & A.R. Purchase in 1938). The grass was collected in 1988 in the Tucson Mountains, "locally common on roadside, rare in canyon bottom" (*Van Devender 88-678*); there are no prior collections of this species from the Santa Cruz Valley and it appears to be generally uncommon. *KM 21-132*

‡ * *Echinochloa colonum* (Linnaeus) Link. Junglerice. Warm-season annuals. Locally common around the toad pond on old Church Wash, not seen elsewhere. *Thornber s.n./ARIZ 241388*, 24 Aug 1901, "SW Tucson, near Indian Village"; *Thornber 2547*, 30 Oct 1902, Santa Cruz Valley, Tucson. *KM 21-124a*

‡ * *Eragrostis cilianensis* (Allioni) Vignolo-Lutati ex Janchen. Stinkgrass. Warm season annuals. Widely scattered or uncommon, growing on the bank of the West Branch. Thornber made several early collections of this species in the Rillito, but none from the Santa Cruz Valley; this one is from a bit upstream: *D. Griffiths 1653*, Sept 1900, "Papago Reservation, Arizona". *KM 21-086*

* *Eragrostis lehmanniana* Nees. Lehmann's lovegrass. Warm-season annuals. Scattered along the bank of the lower West Branch and on the Church Wash diversion. *KM 21-101*

Eriochloa acuminata (Presl) Kunth var. *acuminata*. South-western cupgrass. Warm-season annuals favoring relatively wet places. Locally abundant on the Church Wash diversion. Thornber collected this on the Rillito in 1902 and remarked of it in Tucson in 1938 as "a common weed in lawns"; there are several collections from the Tucson Moun-

tains and other riparian areas in Tucson, but none explicitly from the Santa Cruz Valley. *KM 21-120*

† *Eriochloa aristata* Vasey. Bearded cutgrass. Warm-season annuals. Scattered on the floodplain in patches of other herbs. The following is potentially from upstream: *Thornber s.n./ARIZ 358133*, 24 Aug 1901, "6 mi SW of Tucson". *KM 21-124*

Heteropogon contortus (Linnaeus) P. Beauvois ex Roemer & Schultes. Tanglehead.

Perennials, flowering in summer. Uncommon, growing on the bank of the West Branch channel. *KM 21-138*

† *Hordeum murinum* Linnaeus subsp. *glaucum* (Steudel) Tzevel. Wild barley. Cool season annuals. Common, sometimes locally abundant, growing in the understorey of the mesquite forest and on the floodplain. *Thornber s.n./ARIZ 116956*, 11 March 1902, Santa Cruz Valley, Tucson. *KM 21-051*

† *Hordeum pusillum* Nuttall. Little barley. Cool-season annuals. Growing "in heavy soil in an enhanced swale" on the old Church Wash near its junction with the West Branch of the Santa Cruz, among *H. murinum* (Anntia Harlan, personal communication). *Thornber s.n./ARIZ 116910*, 11 April 1903, Santa Cruz Valley, Tucson – "a common weed"; *Thornber 8141*, 15 April 1913, Santa Cruz bottom lands, Tucson; *Thornber s.n./ARIZ 116909*, 2 May 1913, Santa Cruz bottom lands, Tucson; *Thornber 9178*, 10 May 1913, Santa Cruz bottom lands, Tucson. *A.Harlan AH-01-02*

† *Hordeum vulgare* Linnaeus. Common barley. Cultivated annual crop and occasional escape. A few plants near the toad pond on the old Church Wash channel. *Thornber 5377*, 6 May 1903, Santa Cruz bottoms, Tucson – "Growing in the river bed from seeds scattered. A much cultivated crop here." *KM*, observation, 3 Sept 2001

† *Leptochloa fusca* (Linnaeus) H.B.K. subsp. *uninervia* (Presl) N. Snow. Mexican sprangletop. Warm season annuals. Locally common along the Church Wash diversion. *Thornber s.n./ARIZ 114044*, 2 Aug 1905, Tucson – "Recently introduced!!" *KM 21-067*

† *Leptochloa viscida* (Scribner) Beal. Sticky sprangletop. Summer annuals. Growing in wet ground around the toad pond on the old Church Wash channel. *C.G.Pringle s.n./ARIZ 134975*, 17 June 1882 & 26 Oct 1882, "wet, clayey soil, valley of the Santa Cruz, Tucson"; *Thornber s.n./ARIZ 320320*, 3 Sept 1903, Santa Cruz Valley, Tucson – Type Locality Specimen; *Thornber 45*, 24 Sept 1903, Santa Cruz bottoms, Tucson. *KM 21-125*

* *Melinis repens* (Willdenow) Zizka subsp. *repens*. Natal grass. Perennials, flowering in the warm season. Uncommon on the bank and channel floor of the West Branch.

The earliest collection of this species at ARIZ is a cultivated specimen from "Tucson" in 1892 (*Toumey s.n./ARIZ 15591*, as *Panicum teneriffe* var. *rosea*). Thornber collected it from the UA grass garden in 1904 (*Thornber 5375*), and several specimens were prepared by the Soil Conservation Service in 1937 and 1938. The earliest collection in Tucson of a "wild" specimen is from Sahuaro [sic] National Monument in 1939 (*A.A.Nichol s.n./ARIZ 15592*), but there are none from the Santa Cruz Valley. *KM 21-068*

* *Panicum antidotale* Retz. Giant panic grass. Perennials, flowering in the summer. Uncommon?, widely scattered along the margin of the West Branch channel. The species was introduced from Australia by the Soil Conservation Service, and the SCS prepared several specimens for ARIZ in 1936. In 1951, it was "common along roadsides in east Tucson" (*K.F.Parker 7750*). There are no collections of this species at ARIZ explicitly from the Santa Cruz Valley. *KM 21-046*

† *Panicum stramineum* Hitchcock & Chase. Witchgrass. Warm-season annuals. Scattered along the Church Wash diversion, not seen elsewhere. *Thornber 219*, 2 Aug 1903, "4 mi NW of Tucson"; *Thornber s.n./ARIZ 164180*, 2 Sept 1903, "4 mi NW along railroad track". *KM 21-121*

† *Pappophorum vaginatum* Buckley. Pappus grass. Warm season annuals. Scattered along the West Branch and the Church Wash diversion. *KM 21-052*

* *Pennisetum ciliare* (Linnaeus) Link. Buffel grass. Perennials, flowering in the warm season. Scattered along wash margins and occasional on the floodplain. *KM*, observation, 27 July 2001.

† *Phalaris caroliniana* Walter. Carolina canary grass. Cool season annuals. Widely scattered along the margins of the West Branch and in the forest understorey. *Thornber 5520*, 23 April 1903, Santa Cruz bottoms, Tucson. *KM*, observation, 19 July 2001

† *Poa bigelovii* Vasey. Bigelow's bluegrass. Cool season annuals. Scattered on the floodplain. *Thornber s.n./ARIZ 259488*, 11 April 1905, Santa Cruz River Valley, Tucson – "common". *KM*, observation, 21 July 2001

† *Setaria macrostachya* H.B.K. Plains bristlegrass. Perennials, flowering in the warm season. Scattered along the banks of the West Branch. *KM 21-069*

† *Sorghum halepense* (Linnaeus) Persoon. Johnson grass. Perennials, flowering in warmer weather. Large bunches scattered along the West Branch, occasional on the floodplain. *KM*, observation, 19 July 2001

† *Sporobolus airoides* (Torrey) Torrey. Alkali sacaton. Perennials, flowering in summer. Large bunches scattered

along the old Church Wash channel, not seen elsewhere. *Thorner* 2265, 19 Aug 1904, Santa Cruz Valley, Tucson. *KM* 21-131

Sporobolus cryptandrus (Torrey) A. Gray. Sand dropseed. Perennials, flowering in the summer. Uncommon?, large bunches scattered on the floodplain; often a plant of well-drained soils. Among several early collections in Tucson, *Thorner* noted of a specimen in 1903, "mesas – a common species"; there are no prior collections from the Santa Cruz Valley. *KM* 21-107

Vulpia octoflora (Walter) Rydberg var. *hirtella* (Piper) Henrard. Six-weeks fescue. Cool season annuals. Common? on the floodplain. *Thorner* 7325, 15 April 1915, Santa Cruz River valley, Tucson; *C.E. Clarkson s.n./ARIZ* 170208, 6 May 1916, Santa Cruz River bottoms, Tucson. *KM*, observation, 21 July 2001

POLEMONIACEAE

Eriastrum diffusum (A. Gray) Mason. Cool season annuals. Scattered on the floodplain, observed as dry plants in the field. *Shreve* 10077, 28 March 1941, Santa Cruz flood plain, Tucson. *KM*, observation, 21 July 2001

POLYGONACEAE

Eriogonum abertianum Torrey. Wild buckwheat. Non-seasonal annuals. Uncommon?, widely scattered on the floodplain and margins of the West Branch. Several collections have been made from Tucson; the species was collected at San Xavier Mission on 13 Mar 1926 (*Loomis* 1145). *KM* 21-053 & 21-57

Eriogonum deflexum Torrey. Skeleton weed. Perennial herbs, flowering in warmer weather. Uncommon, growing on the margin of the West Branch channel. *KM* 21-081

* *Polygonum argyrocoleon* Steudel. Silversheath knotweed. Perennial herbs, flowering in warmer weather or non-seasonal. Abundant around a pond on the old Church Wash; not observed elsewhere. *KM* 21-075

† * *Rumex crispus* Linnaeus. Curly-leaf dock. Cool season annuals. Uncommon?, growing on the margin of the West Branch channel. *Thorner s.n./ARIZ* 43612, 28 Aug 1901, Santa Cruz valley; *Thorner* 2508, 25 May 1903, "NW of Tucson"; *Thorner s.n./ARIZ* 30639, 10 May 1913, Santa Cruz valley. *KM*, observation, 21 July 2001

RESEDACEAE

† *Oligomeris linifolia* (Vahl) Macbride. Linearleaf cambess. Cool season annuals. Common, scattered on the floodplain. *KM*, observation, 21 July 2001

RHAMNACEAE

† *Zizyphus obtusifolia* (Hooker) A. Gray. Graythorn. Shrubs, flowering in the warm season. Common, scattered throughout the understory of the mesquite forest along the West Branch and occasional on the floodplain. Caterpillars of the moth, *Cargida pyrrha* (Notodontidae), were observed in abundance on these shrubs. *KM* 21-054

SCROPHULARIACEAE

† *Maurandya antirrhiniflora* Humboldt & Bonpland. Snapdragon vine. Perennial vines, flowering in the summer. Common, climbing on shrubs in the understory of the mesquite forest and along the margins of the West Branch. *Thorner* 476, 23 April 1903, Santa Cruz bottoms, Tucson; *Thorner s.n./ARIZ* 328219, 28 May 1904, Santa Cruz Valley near Tucson; *Thorner* 2473, 19 May 1905, Santa Cruz Valley, Tucson. *KM* 21-055

† *Penstemon parryi* A. Gray. Beardtongue. Perennial herbs, flowering in the cool season. Scattered along the margins of the West Branch. *Thorner* 2474, 19 May 1905, Santa Cruz Valley; *Mrs. W. Kitt s.n./ARIZ* 64075, 20 April 1915, San Xavier Mission, Tucson. "flowers white". *KM*, observation, 19 July 2001

† *Veronica peregrina* Linnaeus. Necklace weed. Cool season annuals. Scattered in the understory of mesquite along the old Church Wash channel. *Thorner* 479, 11 April 1903, Santa Cruz River bottoms, Tucson; *Thorner s.n./ARIZ* 64438, 22 April 1903, Santa Cruz bottoms, Tucson; *Thorner s.n./ARIZ* 64432, 10 May 1913, Santa Cruz bottom land, Tucson; *Shreve s.n./ARIZ* 64413, March 1914, Santa Cruz flood plain, Tucson. *KM*, observation, 27 July 2001

SIMMONDSIACEAE

Simmondsia chinense (Link) Schneider. Jojoba. Shrubs, flowering in the winter. A single plant observed growing in the bosque understory near the Enchanted Hills wash. *KM*, observation, 8 February 2002

SOLANACEAE

† *Lycium andersonii* A. Gray. Anderson wolfberry. Shrubs, flowering in summer or with rain. Common, scattered in the understory of the mesquite forest, along the margins of washes, and occasionally on the floodplain. *Thorner s.n./ARIZ* 15306, 15 Aug 1901, Santa Cruz River Valley, Tucson; *Thorner s.n./ARIZ* 15281, 1 Nov 1902, Santa Cruz bottoms, Tucson; *Thorner* 33, 24 Sept 1903, Santa Cruz River Valley, Tucson. *KM* 21-076

† *Lycium fremontii* A. Gray. Fremont wolfberry. Shrubs, flowering in the spring. Common, scattered in the

understory of the mesquite forest and along the margins of washes. *Thornber s.n./ARIZ 15325*, 2 Feb 1905, Santa Cruz River bottoms, Tucson. *KM*, observation, 21 July 2001
 ‡ *Nicotiana obtusifolia* Martens & Galeotti. Desert tobacco. Perennial herbs, flowering year-round with rain. Scattered along the margins of the West Branch. *KM 21-133*

‡ *Physalis acutifolia* (Miers) Sandwith. Sharpleaf groundcherry. Summer annuals. Scattered on the floodplain in dense patches of other herbs; here, it has been persecuted somewhat as it is suspected as being toxic to grazing animals. A fascinating affiliation was observed between flowers of this plant, a crab spider, and a small, native bee. *Thornber 2020*, 27 Nov 1902, Santa Cruz Valley, Tucson – “a common weed”. *KM 21-122*

‡ *Solanum elaeagnifolium* Cavanilles. Silverleaf nightshade. Perennial herbs, flowering in the warm season. Locally common, growing in the understory in places and on the floodplain. *Thornber s.n./ARIZ 320395*, 30 May 1903, Santa Cruz Valley, Tucson; *Thornber s.n./ARIZ 322653*, 20 Aug 1905, Santa Cruz bottoms, Tucson. *KM*, observation, 19 July 2001

TAMARICACEAE

* *Tamarix aphylla* Linnaeus. Athel saltcedar. Trees, flowering year-round. Occurring in residential settings and occasional on the floodplain. There are two collections of this species from Tucson from 1945 and 1958; there are no collections at ARIZ explicitly from the Santa Cruz Valley. *KM 21-115*

VISCAEAE

Phoradendron californicum Nuttall. Desert mistletoe. Epiphytic parasites on woody legumes, fruiting in the cool season. Scattered throughout the mesquite forest along the West Branch. Thornber observed this species on *Prosopis velutina* at Ft. Lowell in 1901 (*Thornber 676*) and on *Acacia greggii* in “Tucson” in 1902 (*Thornber s.n./ARIZ 44246*). The following may be in the Santa Cruz floodplain s.l.: *R.C.Parlett & M.E.Caldwell 89*, 31 Oct 1951, “immediately east of St. Mary’s Hospital, Tucson, on catclaw”. *KM*, observation, 12 July 2001

ZYGOPHYLLACEAE

‡ *Kallstroemia grandiflora* Torrey. Summer poppy. Warm season annuals. Scattered along the wash margins and occasional on the floodplain. *Thornber s.n./ARIZ 322648*, 20 Aug 1905, Santa Cruz bottoms, Tucson; *Thornber 8154*, 12 Oct 1910, Santa Cruz Valley, Tucson. *KM 21-098*

Larrea divaricata Cavanilles subsp. *tridentata* (de Candolle) Felger & Lowe. Creosotebush. Shrubs, flowering with rains.

Uncommon, one plant growing on fill southeast of the intersection of Silverlake and Mission Roads. *KM*, observation, 18 August 2001

‡ * *Tribulus terrestris* Linnaeus. Goat-head, puncture vine. Warm-season annuals. Scattered on the Church Wash diversion, apparently uncommon. Thornber made several early collections in Tucson, but there are none from the Santa Cruz Valley at ARIZ. *KM 21-119a*

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Summer Reading...

A Cactus Odyssey

Journeys in the Wilds of Bolivia, Peru, and Argentina

By James D. Mauseth, Roberto Kiesling, and Carlos Ostolaza

306 pp, 191 color photos, 4 maps, 6 x 9 inch hardcover

List price \$39.95

Publication date: March 2002

Timber Press, Inc. www.timberpress.com

Cacti experts and neophytes, botanical explorers, and arm-chair botanists, all are in for an extraordinary voyage of discovery when they pick up this book. *A Cactus Odyssey* presents the adventures of three field biologists who search out and study rare and exotic cacti in Bolivia, Peru and Argentina over the course of 15 years. The areas covered and the species discussed represent fascinating contrasts within the cactus family. From desert to rainforest and from sea level to great altitudes, members of this family have evolved and survived in these three South American countries for centuries. The cactus family originated in South America, many species developing prior to the period when North and South America became connected. By the time continental drift brought North and South America close enough together that birds could transport cactus seed from South America to Mexico, the cactus flora of South America was already old and diverse. Wilderness areas in South America rich in cacti have few roads and travel is difficult. Due to their relative inaccessibility, little is known about many of the species.

The authors provide page after page of wonderful, very readable descriptions of the South American cacti, accompanied by photos for almost every species described. Their adventure is personalized as they describe the trials of the roads encountered, the extremely long hours they maintain day after day, and their sheer determination and dedication for their botanizing passion. This is an absolutely wonderful read, don't miss it.

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Sincerely,

Margaret Norem, Editor

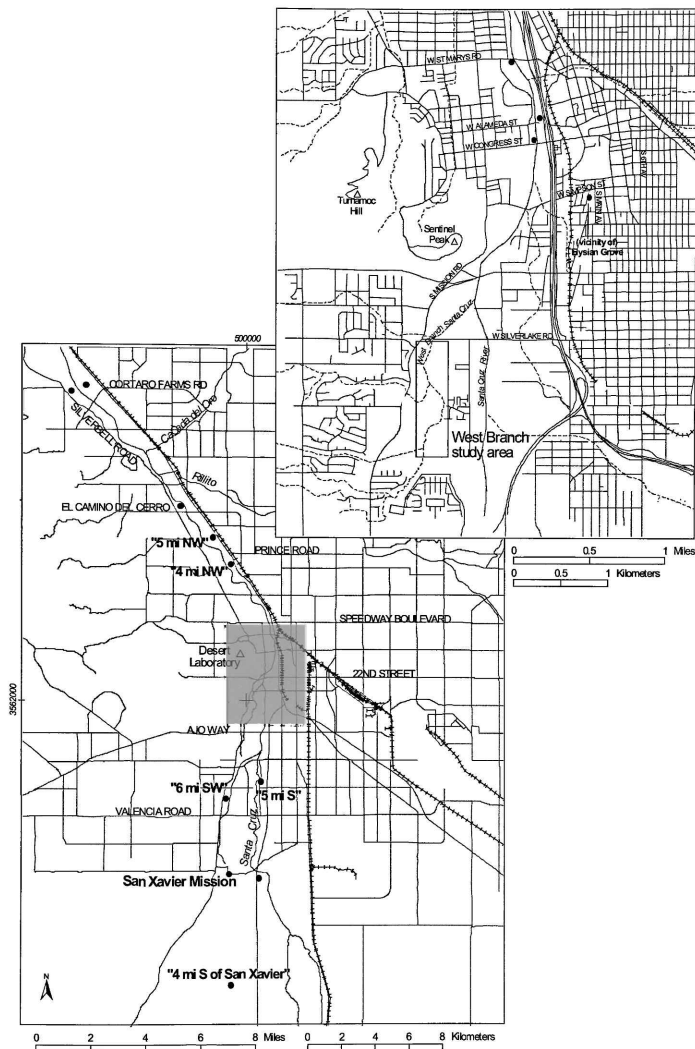


Figure 1. The Santa Cruz Valley at Tucson (shaded area is shown in detail in the inset map). Points indicate approximate locations of collections by Thorner and others for the species in his 1909 list when this information was included on the specimen label. The West Branch study area south of West Silverlake Road is also indicated in the inset map.

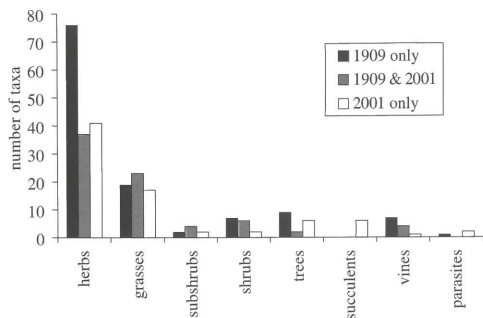


Figure 2. Composition of the revised 1909 flora for the Santa Cruz Valley and the 2001 flora for the West Branch of the Santa Cruz. The plot shows numbers of species unique to each list, and of those that the two hold in common, for each growth form category.

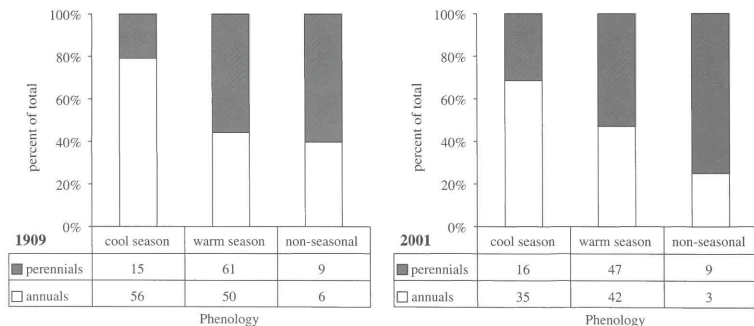
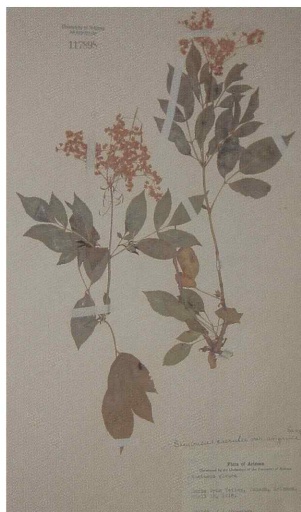


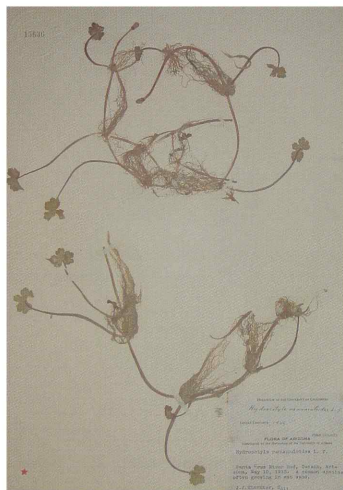
Figure 3. Life strategies and phenologies represented in the 1909 flora for the Santa Cruz Valley and the 2001 flora for the West Branch of the Santa Cruz (tables show the number of taxa in each category).



Populus fremontii S. Watson (Salicaceae) Cottonwood. Collected 30 March 1913 on the Santa Cruz River in Tucson.



Sambucus nigra Linnaeus subsp. *cerulea* Rafinesque (Caprifoliaceae) Elderberry. Collected in the Santa Cruz Valley, 15 April 1915. Of a Rillito specimen, Thorne remarked, "a fine evergreen tree."



Hydrocotyle ranunculoides Linnaeus f. (Apiaceae) Water pennywort. An aquatic herb, collected from the Santa Cruz River bed at Tucson on 10 May 1913.



Salix exigua Nuttall (Salicaceae) Coyote willow. "A common species in the riverbed and along sand bars" of the Santa Cruz in Tucson, 16 May 1913.