What’s in a Name? The Taxonomic History of *Astragalus lentiginosus*.

Brian J. Knaus
Oregon State University
Botany & Plant Pathology
‘Tis but thy name that is my enemy;

Thou art thyself, though not a Montague.

What’s Montague? It is nor hand, nor foot,
Nor keel, nor pod, nor any other part

Belonging to a man. O, be some other name!
What’s in a name? That which we call a rose
By any other name would smell as sweet;
So Romeo would, were he not Romeo call’d,
Retain that dear perfection which he owes
Without that title. Romeo, doff thy name,
And for that name which is no part of thee
Take all myself.

- Shakespeare’s Romeo and Juliet
What’s in a Taxonomic Name?

Plants don’t really care about nomenclature!
What’s in a Taxonomic Name?

Nomenclaturalists (those who name organisms) believe that much is in a name.

For example:

*Astragalus lentiginosus* Douglas ex Hooker

*A. l. var. borreganus* M.E. Jones

A ‘name’ and an ‘authority.’
<table>
<thead>
<tr>
<th>Family</th>
<th>Scientific Name</th>
<th>Infra-rank</th>
<th>count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fabaceae</td>
<td><strong>Astragalus lentiginosus</strong></td>
<td>var.</td>
<td>35</td>
</tr>
<tr>
<td>Polygonaceae</td>
<td><em>Eriogonum umbellatum</em></td>
<td>var.</td>
<td>30</td>
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<tr>
<td>Asteraceae</td>
<td><em>Ericameria nauseosa</em></td>
<td>ssp. &amp; var.</td>
<td>22</td>
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<tr>
<td>Asteraceae</td>
<td><em>Hymenopappus filifolius</em></td>
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<tr>
<td>Malvaceae</td>
<td><em>Sidalcea malviflora</em></td>
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<td><em>Eriogonum nudum</em></td>
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<tr>
<td>Brassicaceae</td>
<td><em>Lepidium montanum</em></td>
<td>var.</td>
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<tr>
<td>Asteraceae</td>
<td><em>Achillea millefolium</em></td>
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<tr>
<td>Caryophyllaceae</td>
<td><em>Arenaria congesta</em></td>
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<td>Fabaceae</td>
<td><em>Trifolium longipes</em></td>
<td>ssp.</td>
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<tr>
<td>Rosaceae</td>
<td><em>Potentilla glandulos</em></td>
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A history of *A. lentiginosus* taxonomy

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<tr>
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<td>2007</td>
<td>42</td>
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† Includes *Tium* sect. Palantia and *Cystium* sects. Coulteriana, Lentiginosa and Diphysa.
**A. lentiginosus** Douglas ex Hooker 1831

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<tr>
<th>Cystium Steven § Coulteri</th>
<th>Cystium § Diphysa</th>
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<tr>
<td><em>A.l. var. ambiguus</em> Barneby 1964</td>
<td><em>A.l. var. araneosus</em> (Sheldon 1894) Barneby 1945</td>
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<td><em>A.l. var. australis</em> Barneby 1945</td>
<td><em>A.l. var. chartaceus</em> M.E. Jones 1895</td>
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<td><em>A.l. var. borreganus</em> M.E. Jones 1898</td>
<td><em>A.l. var. diphysus</em> (A. Gray 1849) M.E. Jones 1895</td>
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<td><em>A.l. var. fremontii</em> (A. Gray 1857) S. Watson 1871</td>
<td><em>A.l. var. idriensis</em> M.E. Jones 1902</td>
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<tr>
<td><em>A.l. var. kennedyi</em> (Rydb. 1929) Barneby 1945</td>
<td><em>A.l. var. latus</em> (M.E. Jones 1893) M.E. Jones 1923</td>
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<tr>
<td><em>A.l. var. micans</em> Barneby 1956</td>
<td><em>A.l. var. oropedii</em> Barneby 1945</td>
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<td><em>A.l. var. nigricalycis</em> M.E. Jones 1895</td>
<td><em>A.l. var. piscinensis</em> Barneby 1977</td>
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<td><em>A.l. var. stramineus</em> (Rydb. 1929) Barneby 1945</td>
<td><em>A.l. var. pohlilii</em> S.L. Welsh &amp; Barneby 1981</td>
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<td><em>A.l. var. variabilis</em> Barneby 1945</td>
<td><em>A.l. var. sesquimetalis</em> (Rydb. 1929) Barneby 1945</td>
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<td><em>A.l. var. vitreus</em> Barneby 1945</td>
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<td><em>A.l. var. yuccanus</em> M.E. Jones 1898</td>
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<td><em>A.l. var. albifolius</em> M.E. Jones 1923</td>
<td><em>A.l. var. maricopae</em> Barneby 1945</td>
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<td><em>A.l. var. antonius</em> Barneby 1945</td>
<td><em>A.l. var. mokiacesis</em> (A. Gray 1878) M.E. Jones 1923</td>
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<td><em>A.l. var. floribundus</em> A. Gray 1865</td>
<td><em>A.l. var. palans</em> (M.E. Jones 1893) M.E. Jones 1898</td>
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<td><em>A.l. var. ineptus</em> (A. Gray 1864) M.E. Jones 1923</td>
<td><em>A.l. var. trumbellensis</em> Welsh &amp; Atwood 2001</td>
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<td><em>A.l. var. kernensis</em> (Jepson 1925) Barneby 1945</td>
<td><em>A.l. var. ursinus</em> (A. Gray 1878) Barneby 1945</td>
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<td><em>A.l. var. lentiginosus</em></td>
<td><em>A.l. var. wilsonii</em> (Greene 1897) Barneby 1945</td>
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<td><em>A.l. var. salinus</em> (Howell 1893) Barneby 1945</td>
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<td><em>A.l. var. scorpionis</em> M.E. Jones 1923</td>
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<td><em>A.l. var. semotus</em> Jepson 1936</td>
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<td><em>A.l. var. sierrae</em> M.E. Jones 1923</td>
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38 varieties!
Distribution of *A. lentiginosus*
Distribution of *A. lentiginosus*
David Douglas June 25, 1826 [?]
A. *lentiginosus* Douglas ex Hook. 1831

John C. Frémont May 3, 1844
A. *l. var. fremontii* (A. Gray 1857)
S. Watson 1871

August Fendler 1847
A. *l. var. diphyus* (A. Gray 1849)
Jones 1895
**A. lentiginosus** Douglas ex Hooker 1831

var. *lentiginosus*

David Douglas 1799-1834

Born in Scone Scotland.

Expedition to the Pacific Northwest from 1823-1827. Trip up the ‘Wallawalla’ river, 1826.

Collection near the sources of the ‘Wallawalla’ and the ‘Utala’ [Imnaha?] River.

Died at age 35 – ‘fell’ into ‘bullock pit’ in Hawaii.
A. *lentiginosus* Douglas ex Hooker 1831

var. *lentiginosus*

**Distribution:** Northern Great Basin, Snake River Plains and Columbia Plateau

**Habitat:** Openings in Ponderosa Pine forest or among sagebrush.
David Douglas June 25, 1826 [?]
A. lentiginosus Douglas ex Hook. 1831

John C. Frémont May 3, 1844
A. l. var. fremontii (A. Gray 1856)  
S. Watson 1871

August Fendler 1847
A. l. var. diphyus (A. Gray 1849)  
M.E. Jones 1895
Asa Gray 1810-1888

Born in Sauquiot, New York.

M.D. in 1831.

Pupil of John Torrey (NY M.D. and Botanist).

Appointed Professor of Natural History at Harvard (1842-1873).

Instrumental in bringing nomenclatural authority to North America.
A. l. var. *diphysus* (A. Gray 1849) M.E. Jones 1895

Distribution: Northwest and Central NM and Northern Arizona.

Habitat: Yucca grassland, Piñon or Juniper forest.
David Douglas June 25, 1826 [?]
*A. lentiginosus* Douglas ex Hook. 1831

John C. Frémont May 3, 1844
*A. l. var. fremontii* (A. Gray 1856)
S. Watson 1871

August Fendler 1847
*A. l. var. diphysus* (A. Gray 1849)
Jones 1895
John Charles Frémont 1813-1890
the ‘Pathfinder’
Born in Savannah, GA.

Several western expeditions. U.S. corps of topographical engineers.

Search for the ‘Buenaventura River.’

May 3, 1844 at ‘the springs at Las Vegas’ [the meadows].

Mexican American War – 1847 appointed military governor of CA. Later convicted of mutiny and subsequently pardoned by President Polk.
Fremont's Western Expeditions

http://www.museumoflocalhistory.org/fremont/
**A.l. var. fremontii** (A. Gray 1857)  
S. Watson 1971

Distribution: Southern Great Basin and Northern Mojave Desert.

Habitat: Creosote, Greasewood, Sagebrush or Rabbit-Brush scrub, Joshua-tree or Piñon-Juniper woodland.
The triumvirate of *A. lentiginosus*

- *A. l. var. fremontii*
- *A. l. var. diphysus*
Distribution of *A. lentiginosus*
A.l. var. *borreganuss* M.E. Jones 1898

Marcus Eugene Jones 1852-1934

Born in Jefferson, Ohio.

Lived in Salt Lake City 1880-1923.


Sold ‘series’ of plants to collectors.

Published is own articles and books.

Collected by horse, bicycle, motorcycle and car.
A. l. var. *borreganus* M.E. Jones 1898

Distribution: Mojave and North-Western Sonoran Deserts.

Habitat: Sandy flats and semistabilized dunes.
On the Kaibab Plateau, Arizona Territory, 1894.
Marcus Jones, Purgatory Ridge, Utah, April, 1926

Jones's "Lizzie" at Yaqui Well, California, January, 1926
Per Axel Rydberg
(1860-1931)

Born Odh, Västergötland, Sweden.
Emigrated to the U.S. in 1882.
First curator of the New York Botanical Garden’s herbarium.
Split *Astragalus* into 28 genera.

“[A]ny form that is worth describing is worth a name and that a binomial is better than any other.” -Rydberg, P.A. 1929.
**A.l. var. sesquimetralis** (Rydb. 1929) Barneby 1945

Distribution: Three known sites in Nevada and California.

Habitat: Alkaline desert seeps.
Rupert Charles Barneby
1911-2000

Born in Trewyn near the Black Mountains, Wales.

Met Dwight Ripley (age 16) at the ‘public’ school Harrow (Rupert was 14).

Dwight was great grandson of Sidney Dillon (an organizer of Union Pacific Railroad).

Driving of the golden spike, Promontory Summit, Utah, May 10, 1869.
A. l. var. variabilis Barneby 1945

Distribution: Mojave Desert and southern San Joaquin Valley.

Habitat: Sandy washes and flats, occasionally on dunes, Creosote bush scrub.
“I think we chose a plant for the reasons one chooses a friend, not for splendor of apparel or purity of profile, but for character and individuality.”

-Rupert Barneby, of gardening with Dwight.

“Ta ta, Dwighteen! And you, Miss Parish, may radioactive daydreams nourish!”

-Rupert Barneby, of *Cymoteris ripleyi* and *Phacelia parishii*. Nuclear testing began at the Nevada Test Site in 1951.
Distribution of *A. lentiginosus*

How do we add to this body of knowledge?
A. l. var. salinus

A. l. var. australis

A. l. var. lentiginosus

A. l. var. coachellae

A. l. var. borreganus

A. l. var. variabilis

Green

Grey

White

Purple
Linear Model:
Principle components as a function of climate

| Estimate | Std. Error | t value | Pr(>|t|) |
|----------|------------|---------|----------|
| (Intercept) | 8.7839 | 0.8243 | 10.66 | <2e-16 |
| data_lm$IV | -1.5999 | 0.1439 | -11.12 | <2e-16 |

Residual standard error: 1.782 on 196 degrees of freedom
Multiple R-Squared: 0.3869, Adjusted R-squared: 0.3838
F-statistic: 123.7 on 1 and 196 DF, p-value: < 2.2e-16

| Estimate | Std. Error | t value | Pr(>|t|) |
|----------|------------|---------|----------|
| (Intercept) | -1.3433 | 0.2283 | -5.883 | 2.02e-08 |
| data_lm$IV | 0.0108 | 0.0016 | 6.872 | 1.08e-10 |

Residual standard error: 1.375 on 174 degrees of freedom
Multiple R-Squared: 0.2135, Adjusted R-squared: 0.209
F-statistic: 47.23 on 1 and 174 DF, p-value: 1.08e-10
Linear Model:

Principle components as a function of climate
DNA Microsatellites
a.k.a. simple sequence repeats (SSRs).

Polymerases aren’t good at ‘counting’, leading to length polymorphism.
A. lentiginosus haplotype network.
Geneland $k = 7$
(Only *A. lentiginosus*)

Map of posterior probability to belong to class 4

Map of posterior probability to belong to class 6
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Incongruence of molecular markers and taxonomy?!

• The taxa are ‘bad.’

• The marker is ‘bad’ (e.g., mutation rate too high).

• Incomplete lineage sorting due to:
  
  Large ancestral effective population size.

  Recent divergence.

• Soil seed bank – overlapping generations.
What’s in a Name? The Taxonomic History of *Astragalus lentiginosus*.

- A taxon
- An ‘authority’
- A good story (sometimes)
- A ‘glimpse’ at the biology of an organism

Do the plants care?

‘Names’ are human constructs to help us understand the world in which we live.
Thank you!

NPSO field research grant

Particularly Dan Luoma!

Nevada Native Plant Society

USDA FS PNW Research Station

Hardman Foundation