

TAXONOMY OF CALIFORNIA PLANTS - Biology 531
SAN DIEGO STATE UNIVERSITY Spring 2012
Dr. Michael G. Simpson, Instructor

Course Site: <<http://www.sci.sdsu.edu/plants/tax>> Blackboard:<<http://blackboard.sdsu.edu>>
Plants of San Diego County: <<http://www.sci.sdsu.edu/plants/sdpls>>
(619-594-4479; msimpson@sunstroke.sdsu.edu)
(Revised 1/15/2012)

Expectations:

If you are intently interested in learning about native plants and working hard to do so, this is your course.

*To climb these coming crests
one word to you, to you and your children:
stay together
learn the flowers
go light
Gary Snyder, Turtle Island (1974)*

*To be able to call the plants by name
makes them a hundredfold more sweet and intimate.
Naming things is one of the oldest and simplest
of human pastimes.
Henry Van Dyke in *Little Rivers* (Dale, 1986.*

Objectives:

This course is designed for the serious student to acquire the basic skills of native plant identification and basic plant community assessment. It is suitable for advanced undergraduates, graduate students in systematics or ecology, and people with positions in private or governmental conservation/environmental organizations.

The primary objectives of this course are both to learn the native and naturalized vascular plant species of our area (primarily our county) and to learn how to know these plants. Thus, the basic training will go beyond simply memorizing names and will encompass the four components of taxonomy: description, identification, nomenclature, and classification. After taking this course, students should be able to:

1. Describe a plant in detail, using descriptive botanical terminology.
2. Identify on-sight approximately **170** (scientific names, correctly spelled) of the common, native and naturalized plants of San Diego County.
3. Identify an unknown taxon using a taxonomic key and specimen comparisons.
4. Collect, document, and process (press, dry, label, mount) a plant from the field. Toward this, each of you will prepare a collection of plants, pressed, dried, labeled, and mounted.
5. Identify, on-sight or using a hand-lens or dissecting scope, approximately 20 angiosperm families (scientific names, correctly spelled).
6. Properly use the collections of the herbarium.

Students are assessed for the above objectives with quizzes, tests, lab practicals, and assignments.

General format of class:

8:00 am - 8:10 am	Quiz
8:10 am - 9:15 am	Lecture, discussion, group learning
ca. 9:15 am - 9:30 am	Break
9:30 am - 11:20 am	Lab time - observing, studying plant material; learning concepts/terms
11:20 am - 11:40 am	Review of new plant species

Always bring textbook and lab manual materials to class!

Classroom and Lab Rules:

Please arrive on time for class, no later than 8:00 am (class starts promptly then) and stay for the full period of the class, until 11:40 am. You may get a snack during the break, but unfortunately there is a "no eating in lab" rule now. During class, I always expect you to respond to me and other students in a positive, respectful, and civil manner. I encourage discussion of plant taxonomy, but keep personal conversation to a minimum. There will be some "quiet times" when I want everyone to stop talking and concentrate on an exercise. Please turn off cell phones and computers (unless we're doing an exercise using computers) during class. No texting in class! (The latter can be very distracting.) Feel free to go to the restroom (very briefly) at any time; just avoid doing so

during lecture and during the last half hour of lab. Please clean up your area completely at the end of class; use the hand brush (cabinet to right of front sink) as needed.

There are times when we will do exercises with computers, and I will ask you to bring your laptop (if you have one) to class. Please, no personal use of computers during class (that includes emailing and checking web sites not related to class activities). You may do this during the break; otherwise, go outside the classroom.

I'm sorry, but due to liability concerns, no friends, relatives, or pets can go on class fieldtrips. No smoking on any fieldtrips (campus or otherwise); it is both discourteous/unhealthy to others and a potential fire hazard.

Cheating will not be tolerated in this class. Any evidence of cheating will result in a minimum of a zero for that exam/quiz and a report to the judicial board of SDSU.

SYLLABUS (subject to change)

Date		Exams / Lecture Topic	Lab or Field Topic / Assignments
Th	Jan. 19	Ch. 1 Plant Systematics and Evolution: an Overview; Ch1: Q1-32; Ch. 16 (Botanical Names, pp. 620-623): Q53-67	Lab 1: Pl.Syst.; <u>Spp. 1-6</u>
T	Jan. 24	Ch. 4 Lycophytes, Ferns; Ch4: Q1, 2, 27, 32, 36-38, 39, 43-49, 54-59, 69-75, 85; California Plant Communities	Lab 4: Ferns; <u>Spp. 7-12</u>
Th	Jan. 26	Ch. 9 Plant Morphology: Roots, stems, leaf structural types Ch9: Q1-19, 134	Ch. 9: Root, stem, lvs; <u>Spp. 13-18</u>
T	Jan. 31	Ch. 9 Plant Morphology: Leaves Ch9: Q20-31; 96-117	Lab 9: Leaves. <u>Spp. 19-25</u>
Th	Feb. 2	Ch. 9. Plant Morphology: Leaves, general terms Ch9:Q118-132	Lab 9: Leaves. <u>Spp. 1-25 Review</u>
Sa	Feb. 4	FIELD TRIP: 8:00-12:00 , Mission Trails Reg. Park-Cowles Mtn., fr. Barker Way, switchback trail [Rain date: Su Feb. 5]	FIELD QUIZ: Spp. 1-25
T	Feb. 7	Ch. 6 Flowering Plants; Ch. 9 Plant Morphology: Flowers & inflor., gen. Ch6: Q1-21; Ch9: Q32-58, 133	Lab 9: Flowers. <u>Spp. 26-31</u>
Th	Feb. 9	Ch. 9 Plant Morphology: Flowers & inflor., gen. Ch9: Q59-80, 135, 136	Lab 9: Flowers. <u>Spp. 32-37</u>
T	Feb. 14	Ch. 9 Plant Morphology: Fruits & seeds, gen. Ch9: Q81-95	Lab 9: Fruits & Seeds. <u>Spp.38-44</u>
Th	Feb. 16	Ch. 9 Plant Description, Review	Appendix 1; Description Exercise Scavenger Hunt; <u>Spp. 45-51</u>
Sa	Feb. 18	FIELD TRIP: 8:00-12:00 , Mission Trails Regional Park Old Mission Dam region [Rain date: Su Feb. 19]	FIELD QUIZ: Spp. 26-51 (+1-25)
T	Feb. 21	EXAM #1: Chs. 1, 4, 6, 9, 16 (Botanical Names); plant communities; spp. 1-51	Assign: Ch15:Q (all)
Th	Feb. 23	Ch. 15 Identification: Q1-16; Chs. 7-8 Angiosperms. Keying.	Lab 15: Plant Identification Assign: Ch17:Q(all); <u>Spp. 52-60</u>
Th	Mar. 1	Ch. 18 Herbarium Use; Ch. 16 Nomenclature: Q1-29 Chs. 7-8 Angiosperms. Keying.	Lab 18: Herbaria. Databases, labels. <u>Spp. 61-70</u>
T	Mar. 6	Ch. 16 Nomenclature: Q30-52 Chs. 7-8 Angiosperms. Keying.	Lab 7-8: Angiosperm families. <u>Spp. 71-77</u>
Th	Mar. 8	FIELD TRIP: 8:00-11:00 am, Torrey Pines State Park [Rain date: T Mar. 13]	QUIZ: Spp. 52-77 (+ extra credit: 1 sp. 1-51)

T	Mar.	13	Chs. 5 Gymnosperms-Conifers & Ephedraceae.	Lab 7-8: Angiosperm families. <u>Spp. 78-84</u>
Th	Mar.	15	Chs. 7-8 Angiosperms. Keying. Desert Plants	Lab 7-8: Angiosperm families. <u>Spp. 85-92</u>
T	Mar.	20	Chs. 7-8 Angiosperms. Keying. Desert Plants	Lab 7-8: Angiosperm families. <u>Spp. 93-100</u>
Th	Mar.	22	Chs. 7-8 Angiosperms. Keying. Desert Plants	Lab 7-8: Angiosperm families: Fabac. <u>Spp. 101-108 (109-112 optional)</u>
Fr	Mar.	23	FIELD TRIP: 8:00am-5:00pm , Anza Borrego Desert State Park: (leave SDSU 6:00 am; camping Fr. night)	QUIZ: Spp. 78-108
Mar. 26 - 30: Spring Recess & Holiday				
T	Apr.	3	Review	
Th	Apr.	5	EXAM #2: Ch. 5, 7 (families), 8 (families), 16; Spp. 52-108	
T	Apr.	10	FIELD TRIP: Miramar: 8:00 am - 11:00 am (Optional) Vernal Pool Plants.	<u>Spp. 113-135</u>
Th	Apr.	12	Chs. 7-8 Angiosperms. Keying. Estuary Plants.	<u>Spp. 136-143</u>
T	Apr.	17	FIELD TRIP: Mission Trails Regional Park: Plant Collecting Field trip. Meet at Old Mission Dam 8:00 AM. (Tentative)	
Th	Apr.	19	Chs. 7-8 Angiosperms. Keying. Estuary Plants.	<u>Spp. 144-155</u>
T	Apr.	24	FIELD TRIP: Tijuana Estuary: 8:00 am - 11:00 am QUIZ: Spp. 132-152; [Rain date Th Apr. 28]	
Th	Apr.	26	Chs. 7-8 Angiosperms. Keying. Estuary Plants.	<u>Spp. 156-166</u>
T	May	1	Chs. 7-8 Angiosperms. Keying. Mountain Plants	<u>Spp. 167-178</u>
Th	May	3	Chs. 7-8 Angiosperms. Keying. Mountain Plants	<u>Spp. 179-192;</u> Herbarium Labels Final Printing, Final collection due!
Sa	May	5	FIELD TRIP: 8:00am - 5:00pm , Cuyamaca, Laguna Mtns. (Rain or shine! Leave SDSU 7:00 am)	QUIZ: Spp. 156-192
T	May	8	Last Day of Class. Final label print out. Collections 1-10 due! Review.	
T	May	15	FINAL EXAM #3: (8-10 am): Spp. 110-192 (1-109)	All Chapters of book that we covered. Families covered.
Th	May	17	Mounting party! (8-10 am): required	Herbarium specimen mounting, databasing

Lecture and Labs:

Lecture and labs are integrated and are the bulk of the course, so please do not miss these! I will not penalize you for being absent for a single lecture/lab. Each additional missed period, without a valid medical excuse, will result in a 1% reduction in your final grade. Missing four or more periods will result in failure of the course.

Due to the cumulative nature of this course, ***I will not admit anyone after the second period of class.***

Blackboard:

Please log into Blackboard (<http://blackboard.sdsu.edu>) and select the Biology 531 page. I will communicate to you this way and occasionally post hand-outs and up-dates.

Grading:

Quizzes:	25%
Exam #1:	20%
Exam #2:	20%
Final exam:	25%
Herbarium collection / project:	5-10%

Quizzes:

Quizzes will be given often, in class or in the field. Quizzes count equally unless noted. Questions answered as an assignment may count as the equivalent of one quiz. One quiz grade (the lowest) will be dropped; thus, there will generally be no makeup for quizzes. Those in class will be announced the period beforehand, if not already on the syllabus. It is your responsibility to make sure you know of these and to be prepared for them. Assume that you will have a quiz in the field on every field trip.

Assignments:

In the first few weeks of the course, I will assign questions from the textbook chapters. Some of these will be answered in class, during learning and review exercises.

I may also assign each of you to come in front of the class and lead a discussion of a keying exercise or plant family. Your participation in this will count as a quiz grade.

Required supplies:

Hand lens (10X - 14X): available in bookstore (have this with you at all times, in class and in the field!)

[I recommend a Bauch & Lomb Hastings Triplet 10x hand lens, if you wish to buy a high quality lens!]

Pocket ruler (metric, 15 cm): available in bookstore

Required Books:

Simpson, M. G. 2010. *Plant Systematics*. 2nd edition. Elsevier Press. (available at Aztec Bookstore)

Simpson, M. G. 2012. *Plant Taxonomy Laboratory Manual*. (available on-line or at Aztec Bookstore)

Optional Books:

Borrer, Donald J. 1960. *Dictionary of word roots and combining forms*. Mayfield Publishing Company, Palo Alto, California. [Recommended as an aid for learning and retaining scientific names.]

Baldwin, B. G., D. H. Goldman, D. J. Keil, R. Patterson, T. J. Rosatti (eds). 2012. *The Jepson Manual: Vascular Plants of California. Second Edition*. Berkeley: University of California Press. [Highly recommended. Note: Keys and descriptions available on-line.]

Lightner, James. 2011. *San Diego County Native Plants*. San Diego Flora, San Diego. [Highly recommended; best color photo book of our plants.]

Rebman, J. P. and M. G. Simpson. 2006. *Checklist of the Vascular Plants of San Diego County*. [To be updated 2012.]

Simpson, M. G. 1998. *Plant Collection and Documentation Field Notebook*.

Herbarium Collection / Project:

A herbarium collection of 5-10 specimens will be required of all enrolled students. The instructor may assign certain regions to certain students to collect; more specimens may be collected as part of a floristic survey of a

general region, e.g., a canyon in San Diego County. The floristic survey will entail a complete species list of plants in the area, with documentation (to be discussed). Alternative, extra projects might involve a taxonomic problem, such as evaluating the validity of a subspecies versus a species or annotating our specimens of a particular group (e.g., a family or genus).

Herbarium specimens (with final label) are due on the dates indicated unless otherwise indicated. Late specimens will result in a 10% decrease per day of that herbarium grade. Mounting is mandatory!

Photography:

I wish to emphasize photography, both in the lab and on field trips. Some of you may wish to photograph plants in the field or in the lab. I will ask that you download images to add to our web page. In addition, a color print makes a nice addition to an herbarium sheet. It is important to practice, in order to get good depth of field and crisp focus; a flash is often useful.

I will also encourage high magnification shots (e. g., of small flowers or flower parts) using the photo-dissecting microscope in the lab.

Field Trips:

This is largely a field course. Thus, scheduled field trips are mandatory and extremely important. Don't miss them! Missing a field trip will (in addition to a missed quiz) result in the following percentile reductions in your final grade: half-day class/weekend field trip: 2.5%; full-day weekend field trip (desert or mountain trips): 5%. (A make-up may be possible, but don't count on it.)

Some field trips will be during the class period. In general, you will be responsible for your own transportation to local sites. There may be a couple of optional field trips, which you may attend if you wish; these will be a good opportunity to collect for your herbarium.

Be field hardy! Wear appropriate clothing: light-weight boots or tennis shoes (preferably with good tread); pants and shirt you don't mind getting dirty or scratched up; hat, jacket, sunblock, sunglasses, etc. as appropriate. **If rain is even a remote possibility, bring a rain jacket; we won't let a little drizzle stop us!** Be ready to go in the field as soon as we arrive at a sight. You should plan to bring water and a snack on all field trips. Bring a lunch and drinks for the all-day weekend field trips; you may bring a small ice chest, or share with someone else.

Bring the following to the field:

Plant Collection and Documentation Field Notebook or forms (in lab manual); pencil

Checklist of the Vascular Plants of San Diego Co.

Class Species List (I suggest making copies of appropriate pages to be taken into the field.)

Hand lens (on cord around neck is handy)

OPTIONAL: *The Jepson Manual* (for the hard-core; carry water-proof in a knapsack if you do bring it)

I will sometimes designate people to collect specimens of some plants we encounter on a field trip (perhaps to key out in class later). If you plan to collect for your herbarium collection, have the following:

1) large and small plastic bags; 2) tags; 3) newspaper; 4) water; 5) hand trowel; 6) hand clippers

We will always press plants in the field using the portable plant presses.

In the field, don't wander off alone or far away from the bulk of the class. Be cautious and use common sense. **Watch out for snakes!** Don't reach for a plant without looking over the area. Even though we will always collect in areas where collection is allowed, be discrete about it.

Despite all of the above precautions and rules, you can still have fun. We will be visiting some beautiful areas, so enjoy the wildlife and your time in the field.

Other Books on Plants of California and Adjacent Regions:

Beauchamp, R. Mitchel. 1986. A flora of San Diego County, California. Sweetwater River Press, National City, California. [NOTE: Out of print. Nomenclature very outdated, but still useful in field.]

Belzer, T. J. 1984. Roadside Plants of Southern California. Mountain Press Publishing Co., Missoula. [NOTE: A good, inexpensive assemblage of color photographs of common plants in our area. Recommended!]

Brown, David E. (ed.) 198x. Desert Plants. Biotic Communities of the American Southwest - U. S. and Mexico. Boyce Thompson Southwestern Arboretum, P. O. Box AB, Superior, Arizona 85273. [Good reference for desert plants; costs only \$13.95]

Conrad, C. Eugene. 1987. Common Shrubs of Chaparral and Associated Ecosystems of Southern California. Pacific Southwest Forest and Range Experiment Station, P. O. Box 245, Berkeley, CA 94701.

- Dale, Nancy. 1986. Flowering Plants: the Santa Monica Mountains, Coastal & Chaparral Regions of Southern California. Capra Press, Santa Barbara. In cooperation with California Native Plant Society.
- Holland, Robert F. 1986. Preliminary Descriptions of the Terrestrial Natural Communities of California. State of California, The Resources Agency, Department of Fish and Game. [Robert F. Holland, Ph.D., Vegetation Ecologist, Nongame-Heritage Program, Sacramento, CA 95814]
- Jaeger, E. C. 1941. Desert Wild Flowers. Stanford University Press, Stanford, California. [NOTE: Nomenclature is outdated, but descriptions and line drawings are very useful.]
- Munz, Philip A. and David D. Keck. 1973. A California flora and supplement. University of California Press, Berkeley. [This manual of California plants is now superseded by the new Jepson Manual, but still valuable.]
- Munz, Philip A. 1974. A flora of southern California. University of California Press, Berkeley. [Still a valuable reference, to use with Jepson. Copies may checked out from the SDSU library.]
- Ornduff, R. 1974. Introduction to California Plant Life. University of California Press, Berkeley. [Excellent reference to plant communities of California.]
- Vasek, Frank C. 1982. A Vegetative Guide to Perennial Plants of Southern California. San Bernardino County Museum Association, Redlands, California.
- Wiggins, I. L. 1980. Flora of Baja California. Stanford University Press, Stanford, California. [NOTE: Needs work, but the only major manual available of this region.]

Books on Cultivated Plants:

- Bailey, L. H. 1951. Manual of Cultivated Plants. Macmillan Publishing Co., Inc., New York.
- Bailey, L. H. 1976. Hortus Third. Macmillan Publishing Co., Inc., New York.
- Graf, A. B. 1976. Exotica, Series 3. Pictorial cyclopedia of exotic plants from tropical and near-tropical regions. 9th ed. Roehrs Company, Inc., E. Rutherford, New Jersey, U. S. A. [NOTE: A more updated version is available in the science reference section of the library.]
- Graf, A. B. 1986. Tropica. Color Cyclopedia of Exotic Plants and Trees. 3rd Edition. Roehrs Company, Inc., E. Rutherford, New Jersey, U. S. A.

Major References for Flowering Plant Family Descriptions and Relationships:

- Harrington & Durrell. 1957. How to identify plants. Swallow Press, Inc.
- Heywood, V. H. 1985. Flowering Plants of the World. Prentice Hall, Inc., Englewood Cliffs, New Jersey.
- Lawrence, G. H. M. 1951. Taxonomy of Vascular Plants. Macmillan Co., New York.
- Mabberley, D. J. 2008. Mabberley's Plant-Book: A Portable Dictionary of the Higher Plants, Their Classification and Uses, 3rd edition. Cambridge University Press, Cambridge. [NOTE: Very useful; highly recommended!]
- Pool, R. J. 1941. Flowers and Flowering Plants, second edition. McGraw-Hill, New York.
- Porter, C. L. 1967. Taxonomy of Flowering Plants, second edition. W. H. Freeman, San Francisco.
- Radford, A. E., W. C. Dickison, J. R. Massey, C. R. Bell. 1974. Vascular Plant Systematics. Harper & Row, New York.
- Smith, James P. 1977. Vascular plant families. Mad River Press, Eureka, CA.