

# Aquaculture Immersion Excursion 2009

## Teacher Workshop



## Using Dichotomous Keys

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*Ocean Science for a Better World™*

# Outline

1. Identification of Organisms
2. What Is a Dichotomous Key?
3. Examples of Dichotomous Keys
4. Activity: Plant Identification Using Dichotomous Keys

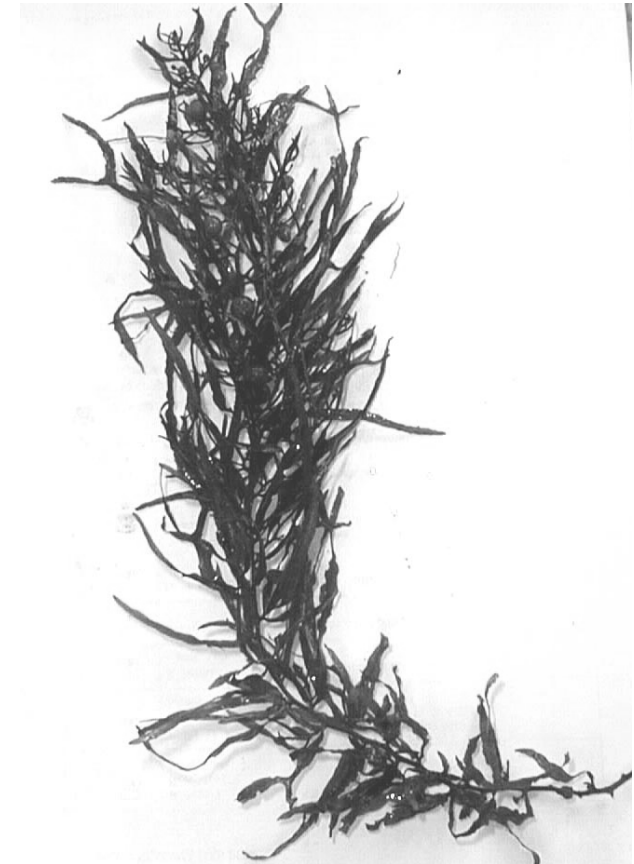
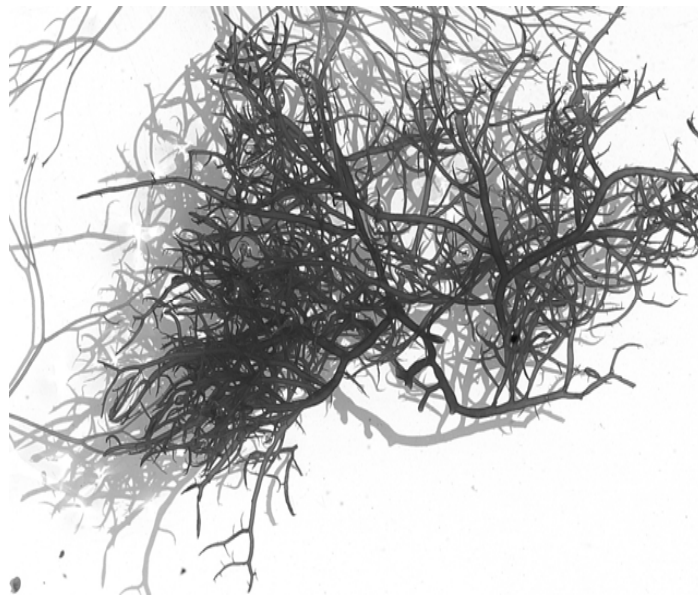
# Identification of Organisms

- Correct identification is needed so that observations about a particular organism can be communicated
- Biologists have developed taxonomic criteria for delineating species
- Organisms are grouped/classified based on shared characteristics
- Taxonomic keys have been devised to facilitate identification for people who are not all experts

Remember that taxonomy is our human attempt to simplify/better understand nature and will always be somewhat artificial

# Classification of Organisms

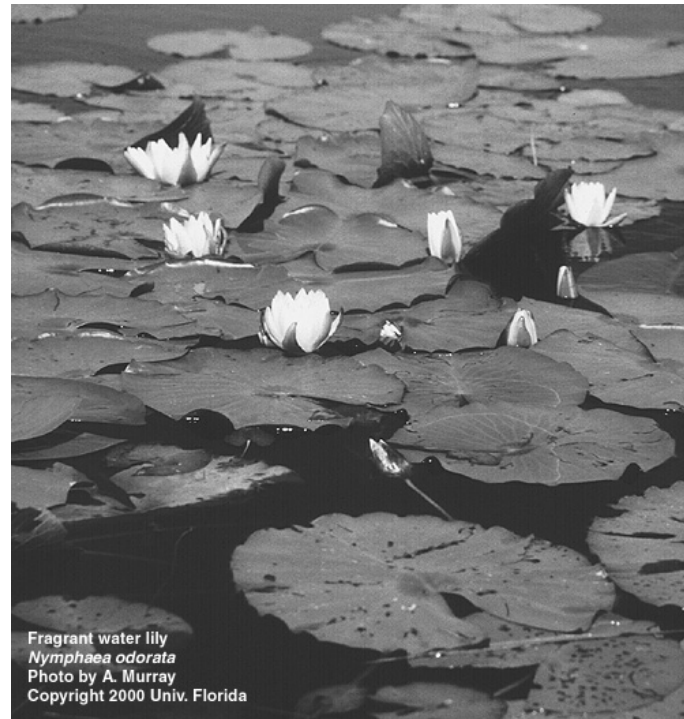
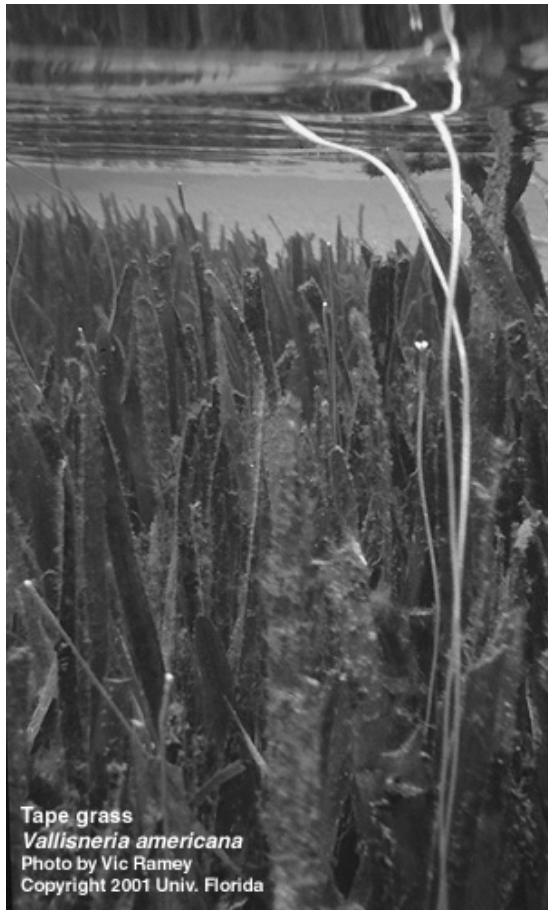
Classification of organisms involves placing them into categories



**Example 1: Seaweeds**  
Color is an important characteristic

# Classification of Organisms

Classification of organisms involves placing them into categories



<http://aquat1.ifas.ufl.edu/>



**Example 2: Freshwater Plants**  
**Habit is an important characteristic**

# Dichotomous Key

Dichotomous = Divided into two parts

- A dichotomous key is a classification tool, used to sort, organize, and identify a collection of objects or living things
- A dichotomous key consists of a series of statements with two choices that describe characteristics
- Each choice leads to additional statements until arriving at the name of the organism being examined
- Characteristics can be quantitative or qualitative
- Careful observation of specimens is needed

# Dichotomous Keys

- An individual key generally focus on a particular group of organisms and/or specific locations
- It is important to have the “right key” to identify a particular organism under study ... otherwise, you will not make a correct identification!
- Some keys suffer from the use of imprecise terms; the best keys use objective, quantitative characteristics, rather than subjective ones
- After a tentative identification with a key, it is good practice to the species description to confirm the identification.

# Dichotomous Key: A Fun Example – Norns



*Norno* sp.

- Norns belong to the genus *Norno*
- Eight species of *Norno* that are generally located in specific regions of the world.
- A dichotomous key can be used to identify this species of norn.

# A Dichotomous Key for Norns

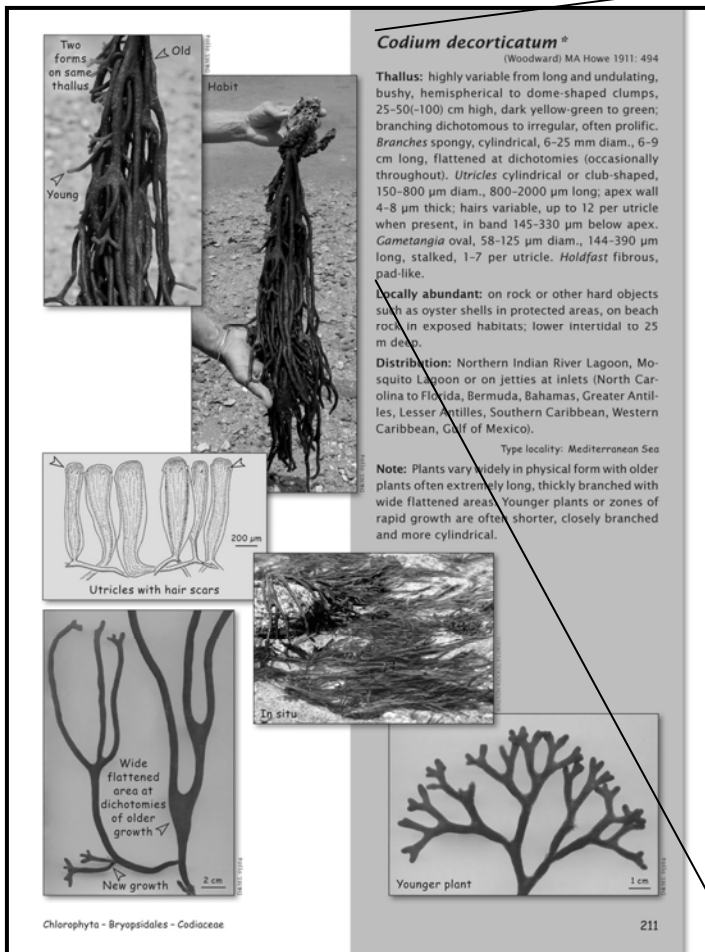
1. Has pointed ears ..... go to 3  
Has rounded ears ..... go to 2
2. Has no tail ..... *kentuckyus*  
Has tail ..... *dakotus*
3. Ears point upward ..... go to 5  
Ears point downward ..... go to 4
4. Engages in waving behavior ..... *dallus*  
Has hairy tufts on ears ..... *californius*
5. Engages in waving behavior ..... *walawala*  
Does not engage in waving behavior ..... go to 6



# A Dichotomous Key for Florida Seagrasses

1	Leaves cylindrical .....	<i>Syringodium filiforme</i> , p. 261
1	Leaves flat, blade-like or strap-shaped .....	2
2(1)	Leaves strap-shaped, greater than 4 cm long .....	3
2(1)	Leaves blade-like, ovoid, less than 4 cm long .....	<i>Halophila</i>
a	Leaves in pairs .....	b
a	Leaves whorled at top of stalk .....	<i>Halophila engelmanni</i> , p. 257
b	Leaves widely ovoid, 3-6 mm wide, 10-25 mm long; margins with extremely fine teeth .....	<i>Halophila decipiens</i> , p. 256
b	Leaves narrowly ovoid, 2-3(-4) mm wide, 5-25 mm long; margins smooth .....	<i>Halophila johnsonii</i> , p. 258
3(2)	Leaves 4-15 mm wide .....	<i>Thalassia testudinum</i> , p. 259
3(2)	Leaves less than 4 mm wide .....	4
4(3)	Leaf apex tapering to one point or tooth, lateral veins obscure .....	<i>Ruppia maritima</i> , p. 262
4(3)	Leaf apex not tapering, leaf tip with three teeth (central tooth and two laterals) .....	<i>Halodule wrightii</i> , p. 260

# Example of Field Guide Information

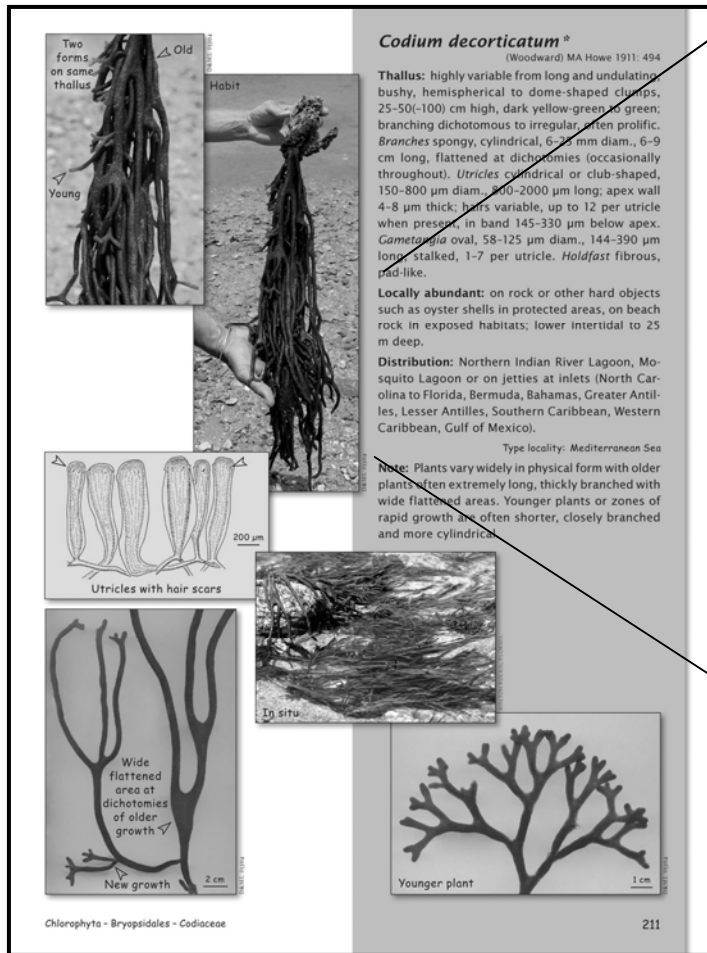


## *Codium decorticatum*\*

(Woodward) MA Howe 1911: 494

**Thallus:** highly variable from long and undulating, bushy, hemispherical to dome-shaped clumps, 25–50(–100) cm high, dark yellow-green to green; branching dichotomous to irregular, often prolific. *Branches* spongy, cylindrical, 6–25 mm diam., 6–9 cm long, flattened at dichotomies (occasionally throughout). *Utricles* cylindrical or club-shaped, 150–800 µm diam., 800–2000 µm long; apex wall 4–8 µm thick; hairs variable, up to 12 per utricle when present, in band 145–330 µm below apex. *Gametangia* oval, 58–125 µm diam., 144–390 µm long, stalked, 1–7 per utricle. *Holdfast* fibrous, pad-like.

# Example of Field Guide Information

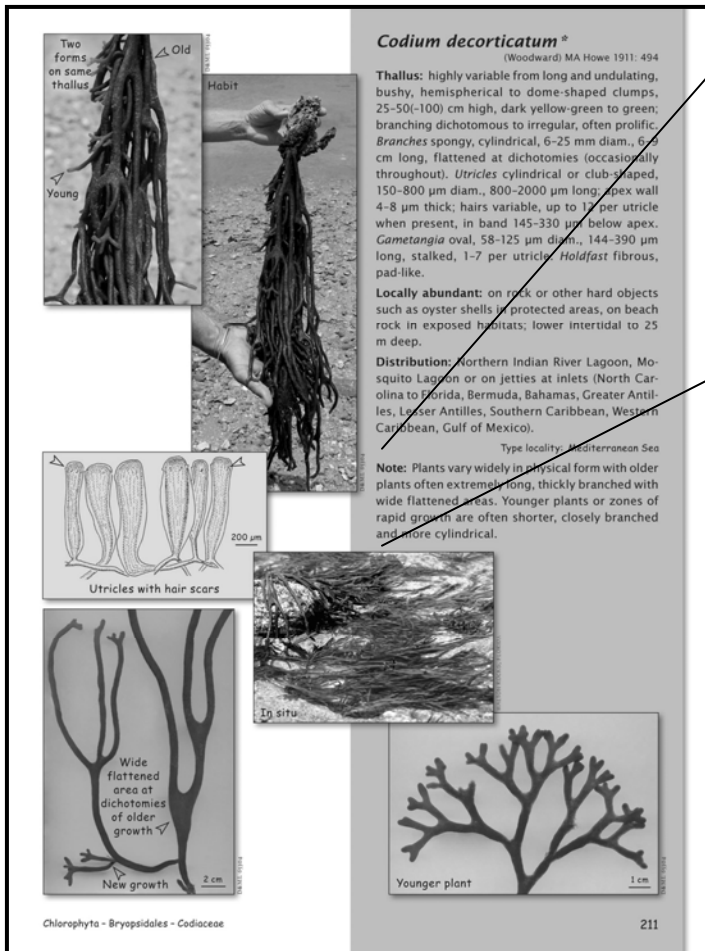


**Locally abundant:** on rock or other hard objects such as oyster shells in protected areas, on beach rock in exposed habitats; lower intertidal to 25 m deep.

**Distribution:** Northern Indian River Lagoon, Mosquito Lagoon or on jetties at inlets (North Carolina to Florida, Bermuda, Bahamas, Greater Antilles, Lesser Antilles, Southern Caribbean, Western Caribbean, Gulf of Mexico).

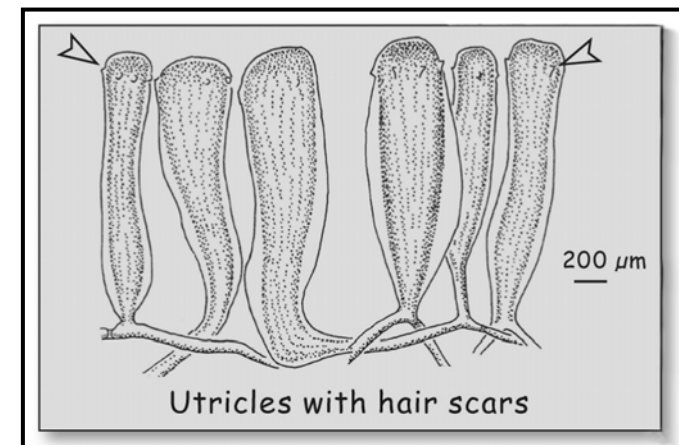
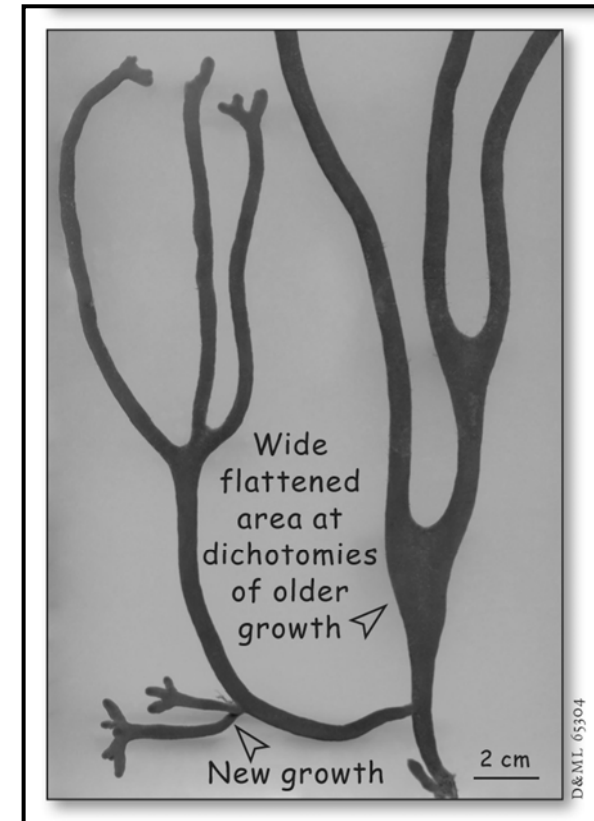
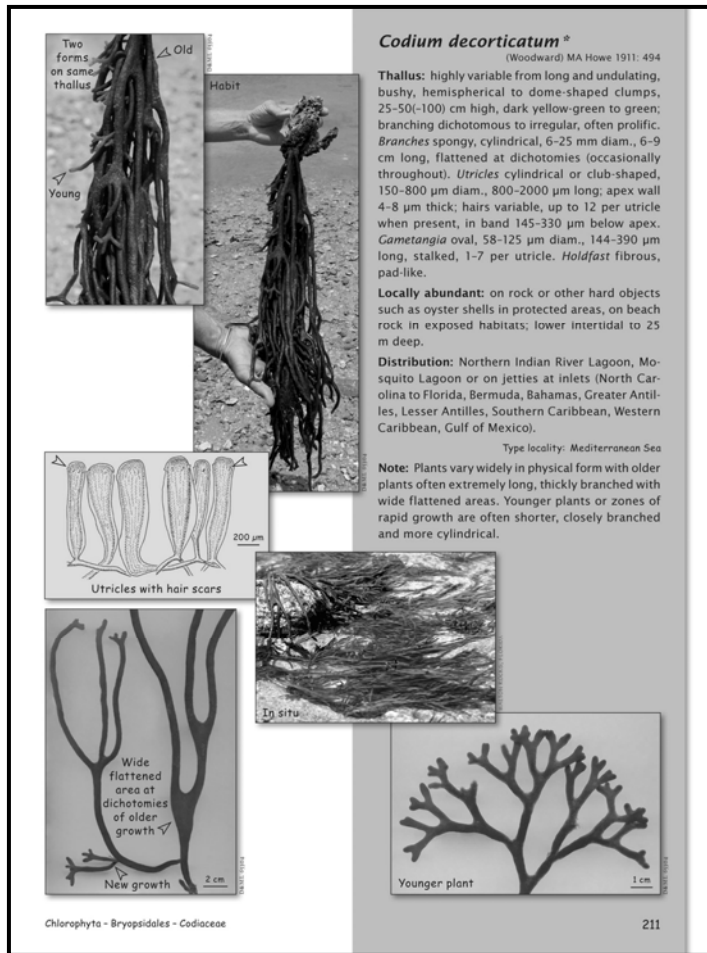
Type locality: Mediterranean Sea

# Example of Field Guide Information



**Note:** Plants vary widely in physical form with older plants often extremely long, thickly branched with wide flattened areas. Younger plants or zones of rapid growth are often shorter, closely branched and more cylindrical.

# Example of Field Guide Information



# Activity:

## Plant Identification Using Dichotomous Keys

**Let's See If It Works!**

**Sometimes There Are Challenges!**

**Classify This!**

[http://www.glencoe.com/sec/science/biology/bio2000/biomovies/e20\\_1int.html](http://www.glencoe.com/sec/science/biology/bio2000/biomovies/e20_1int.html)

# References/Additional Reading

- Hoyer, M.V., D.E. Canfield, Jr., C.A. Horsburgh, and K. Brown. 1996. Florida Freshwater Plants: Handbook of Common Aquatic Plants in Florida Lakes. 264 pp.
- Littler, D.S. and M.M. Littler. 2000. Caribbean Reef Plants: An Identification Guide to the Reef Plants of the Caribbean, Bahamas, Florida and Gulf of Mexico. Offshore Graphics, Inc., Washington, D.C. 542 pp.
- Littler, D.S., M.M. Littler, and M.D. Hanisak. 2008. Submersed Plants of the Indian River Lagoon. OffShore Graphics, Inc. 286 pages.
- Norns: Introduction to a fun dichotomous key  
<http://www.biologycorner.com/worksheets/dichoto.html>

## Plant Aquaculture Module

**Activity: Plant Identification Using Dichotomous Keys**