

# Cattail Hybridization: A Cryptic Form of Invasion in North American Wetlands

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## CATTAILS IN WETLANDS

The word cattails is derived from the appearance of the cigar-shaped flower head or inflorescence. Cattails are not a grass, but are grass-like reeds, or graminoids. They are obligate wetland plants which can occur in saturated soil and in water at various depths. There are 17 species worldwide and they are all in their own separate plant family, Typhaceae. There are three recognized species in North America: *Typha latifolia* L., *Typha angustifolia* L., and *Typha domingensis* Pers. Here, hybridization between the first two species is described, as well as the potential for *Typha domingensis* to hybridize with either of the other two species. Hybrids are often referred to as *Typha x glauca* Godr.

- Native Americans used the whole plant for food, shelter, and clothing – pollen was used to make bread, stems used for thatch, and rhizomes for vegetable. The immature female part of the plant can be eaten like eating corn on the cob.
- During WWII factories were established in Wisconsin and Minnesota to process the seed heads or "fluff" for insulation and shock absorption materials.

## BIOLOGY

***Typha latifolia* L., common or broadleaf cattail:** plants 1-3 meters tall (3-10 ft); leaves 1.0-2.3 cm wide (0.4-1 in), arising from base of plant; male and female parts of spike continuous, rarely separated by 0-0.4 cm (0-0.2 in) naked axis; female portion dark brown, 10-15 cm long (3-6 in), 2-3 cm wide (0.8-1.2 in) at maturity; 2N=30

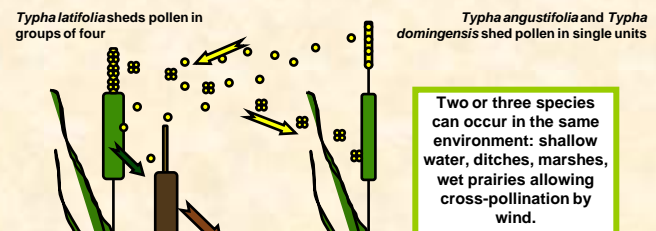
***Typha domingensis* Pers., Southern cattail:** plants 2.5-4 meters tall (6-13 ft); leaves 0.6-1.8 cm wide (0.2-0.7 in), arising from base of plant; male and female parts of spike separated by 1-8 cm (0.4-3.2 in) naked axis; female portion cinnamon brown to straw-colored to bright orange-brown, 10-20 cm long (4-8 in), 1.3-2.5 cm wide (0.5-1 in) at maturity; 2N=30

***Typha angustifolia* L., narrowleaf cattail, considered exotic:** plants 1-3 meters tall (3-10 ft); leaves 0.5-1.1 cm wide (0.2-0.5 in), arising from base of plant; male and female parts of spike separated by a 2-12 cm (0.8-5 in) naked axis; female portion brown, 10-20 cm long (4-8 in), 1-2 cm wide (0.4-0.8 in) at maturity; 2N=30

***Typhax glauca* Godr. hybrid cattail; recognized morphologically in the 1960s:** highly variable features; plants can reach 3-4.5 meters tall (10-15 ft); variable size of female and male parts; naked axis variable, color of female portion brown to tan; 2N=?

### Sexual Reproduction:

Pollen is shed from the male spike of either species and pollinates the female spike of the other species; female spike ripens and produces fertile seeds.



Two or three species can occur in the same environment: shallow water, ditches, marshes, wet prairies allowing cross-pollination by wind.

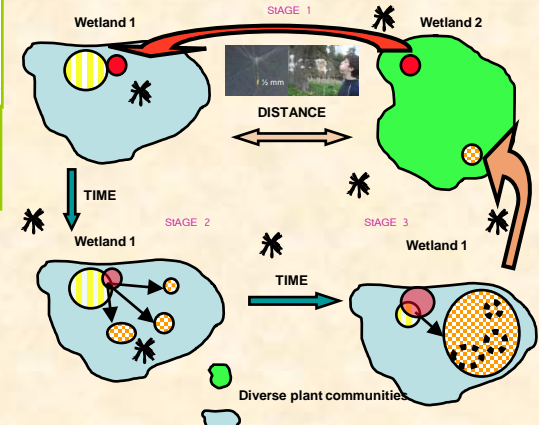
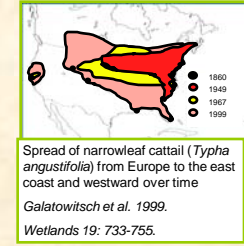
All three species have the same chromosome number in somatic tissues (2N=30). Since each pollen sperm and egg cell in each species have half the somatic chromosomes (N=15), they can pair during fertilization and form fertile seeds (2N=30). Thousands of seeds are shed from the female spike.

### Asexual Reproduction:

Rhizomes grow and each plant increases by clonal growth.



## HYBRIDS CAUSE LANDSCAPE CHANGE AND REDUCE BIODIVERSITY



- Stage 1 - Exotic cattail seeds blow into a wetland with common cattail.
- Stage 2 - Some plants are inter-fertile, produce fertile hybrid seeds, which germinate to produce hybrid plants.
- Stage 3 - Hybrid plants spread by rhizomes and more seeds, "swamping" another wetland or the first one, displacing both exotic and native species, driving out the native cattail.

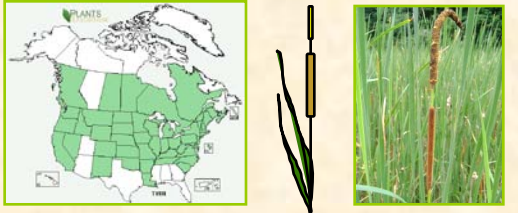
### COMMON CATTAIL or BROADLEAF CATTAIL, *Typha latifolia* L.



### SOUTHERN CATTAIL, *Typha domingensis* Pers.



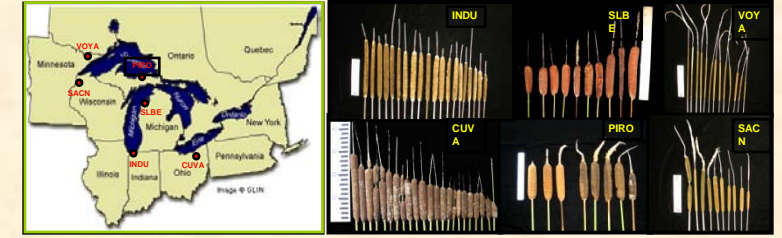
### EXOTIC CATTAIL or NARROWLEAF CATTAIL, *Typha angustifolia* L.



### HYBRID CATTAIL, *Typha x glauca* Godr.



## CATTAIL LINEUP: WHAT KIND OF CATTAILS ARE FOUND IN MIDWEST PARKS?

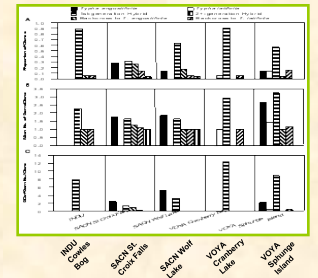


CUVA-Cuyahoga NP, INDU-Indiana Dunes NL, PIRO-Pictured Rocks NL, SACN-St. Croix National Scenic Riverway, SLBE-Sleeping Bear Dunes NL, VOYA-Voyagers NP

### THE PROOF IS IN THEIR DNA!!



### MICROSATELLITES SHOW CLONAL PATTERNS OF RELATIONSHIP



- Limited evidence shows that common cattail, *T. latifolia*, is adapted to growing in shallower water than narrowleaf cattail, *T. angustifolia*, and *Typha* hybrids.
- Based on previous data from herbarium specimens and the INDU, SACN, and VOYA study, the general westward progression of *T. angustifolia* over time varied on a subregional scale and interbred with *T. latifolia*, and possibly with *T. domingensis*.
- F1 (first generation) hybrids of *T. latifolia* and *T. angustifolia* tend to be represented by larger clone sizes for all the sites evaluated, whereas the smallest clones were more frequently represented by backcross and F2 advanced generations.
- To date broadleaf cattail, *Typha latifolia*, has been positively identified using DNA analysis in Voyagers National Park. Work continues at CUVA, PIRO, and SLBE; recent funding will permit evaluation of cattails in EVER.