Konzervační genetika

GENETICKÉ ASPEKTY ZAVLEČENÝCH A INVAZIVNÍCH DRUHŮ

INVESTICE DO ROZVOJE VZDĚLÁVÁNÍ

OPVK (CZ.1.07/2.2.00/28.0032)

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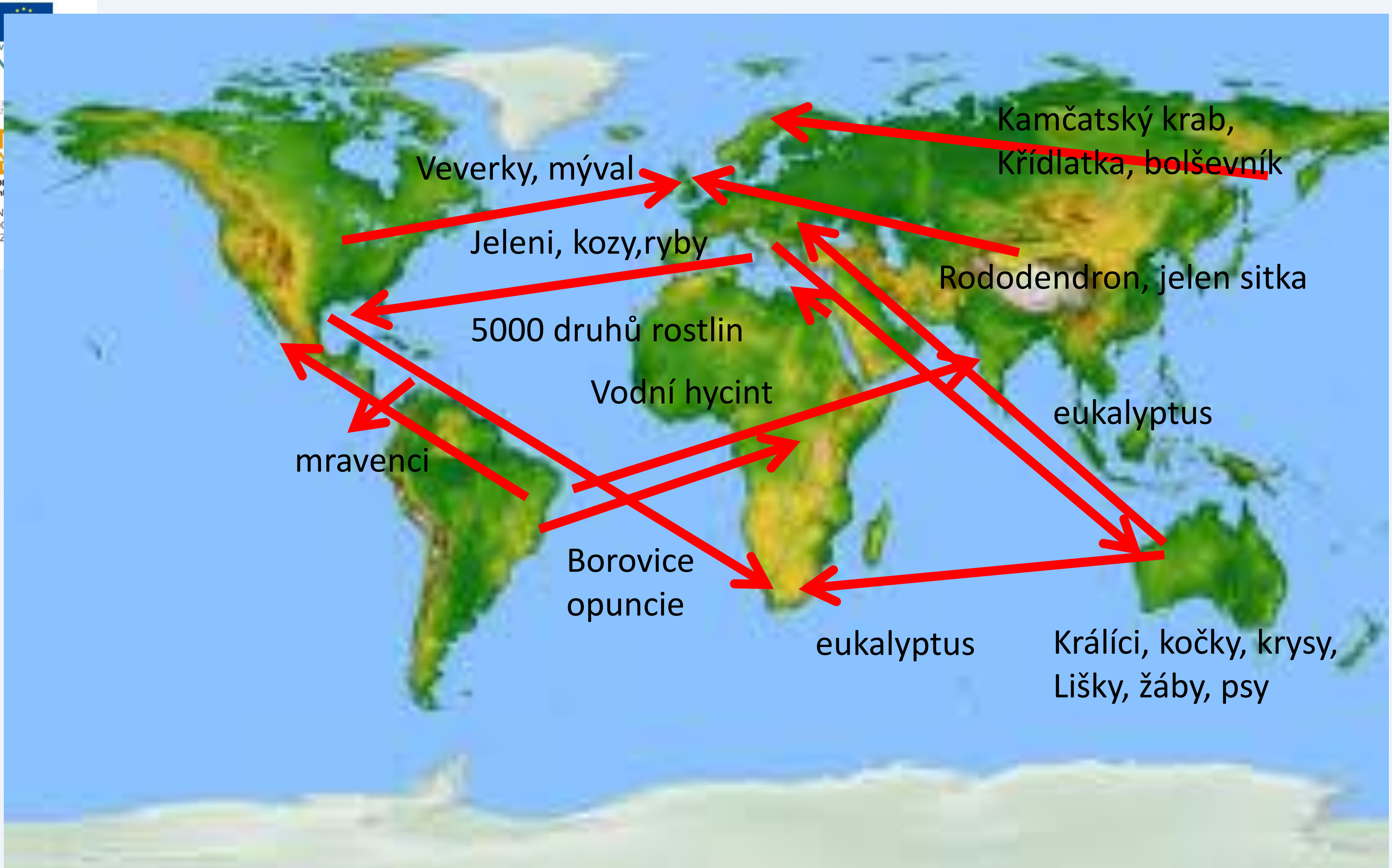
Homogenizace flóry a fauny vlivem člověka

Je odhadováno že během posledních 500 let (přibližně od doby 1492 tj. objevení Ameriky a zámořských objevů) – zavlečené druhy dominují přibližně 3% zemského povrchu ! (Mack 1985)

Počet druhů, které díky vlivu člověka překročily biogeografické bariéry je mnohem větší, ale přibližně jen 1% druhů se stane invazivními v novém prostředí.

Některé oblasti však mají více než 20% flóry cizí (Nový Zealand, až 50%, např. UK z 2834 je 1264 druhů rostlin cizích).

Probíhá homogenizace flóry a fauny uvnitř i mezi kontinenty.


Kamčatský krab,
Křídlatka, bolševník
Veverky, mýval
Jeleni, kozy,ryby
Rododendron, jelen sitka
5000 druhů rostlin
Vodní hycint
eukalyptus
mravenci
Borovice
opuncie
eukalyptus
Králíci, kočky, krysy,
Lišky, žáby, psy

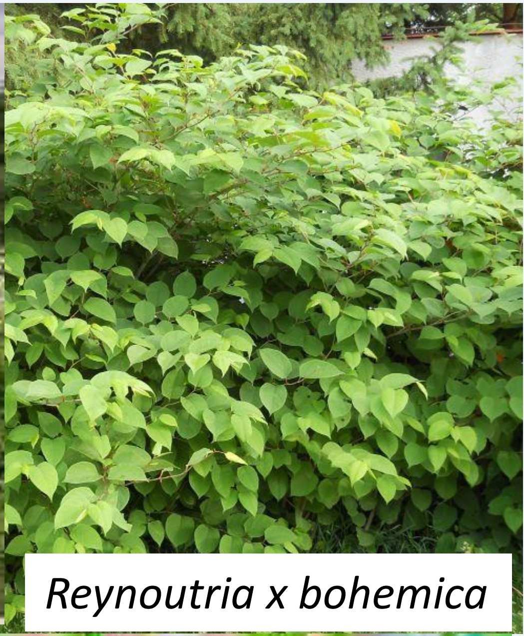
Centaurea solstitialis (původem z jižní Evropy dominuje velké části Kalifornie)

Eichhornia crassipes (původem z jižní Ameriky, nyní dominuje říční systémy Afriky a Asie)

Invazivní druhy v České republice

Impatiens glandulifera

Heracleum mantegazzianum



Reynoutria x bohemica

nutrie (*Myocastor coypus*), norek americký (*Mustela vison*), plzák španělský (*Arion lusitanicus*)

Delivering Alien Invasive Species Inventories for Europe

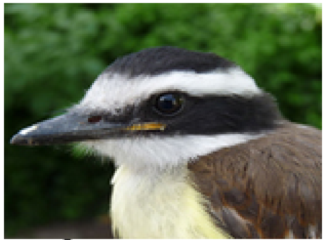
» Campylopus introflexus
one of the 100 worst alien species in Europe, click **here** to see the full list.

Delivering Alien Invasive Species Inventories for Europe

Biological invasions by non-native or 'alien' species are one of the greatest threats to the ecological and economic well-being of the planet. Alien species can act as vectors for new diseases, alter ecosystem processes, change biodiversity, disrupt cultural landscapes, reduce the value of land and water for human activities and cause other socio-economic consequences for man.

To help those tackling the invasive species challenge, this website provides a 'one-stop-shop' for information on biological invasions in Europe. Please note that the DAISIE database behind this website is continually being updated. Read more about DAISIE.

DAISIE Handbook of alien species in Europe available



ISSG Invasive Species Specialist Group

Invasive Species of the Week

Search Species

Search for information on one of the 12122 alien species occurring in Europe.

Search Regions

Search regions to explore the alien species threats across Europe, for 81 inland and 57 coastal and marine areas.

Search Experts

Search for one of the 835 experts on biological invasions in Europe

This website was developed with support from the European Commission under the Sixth Framework Programme through the DAISIE project - Contract Number: SSPI-CT-2003-511202. **Leave Feedback**

Arion vulgaris

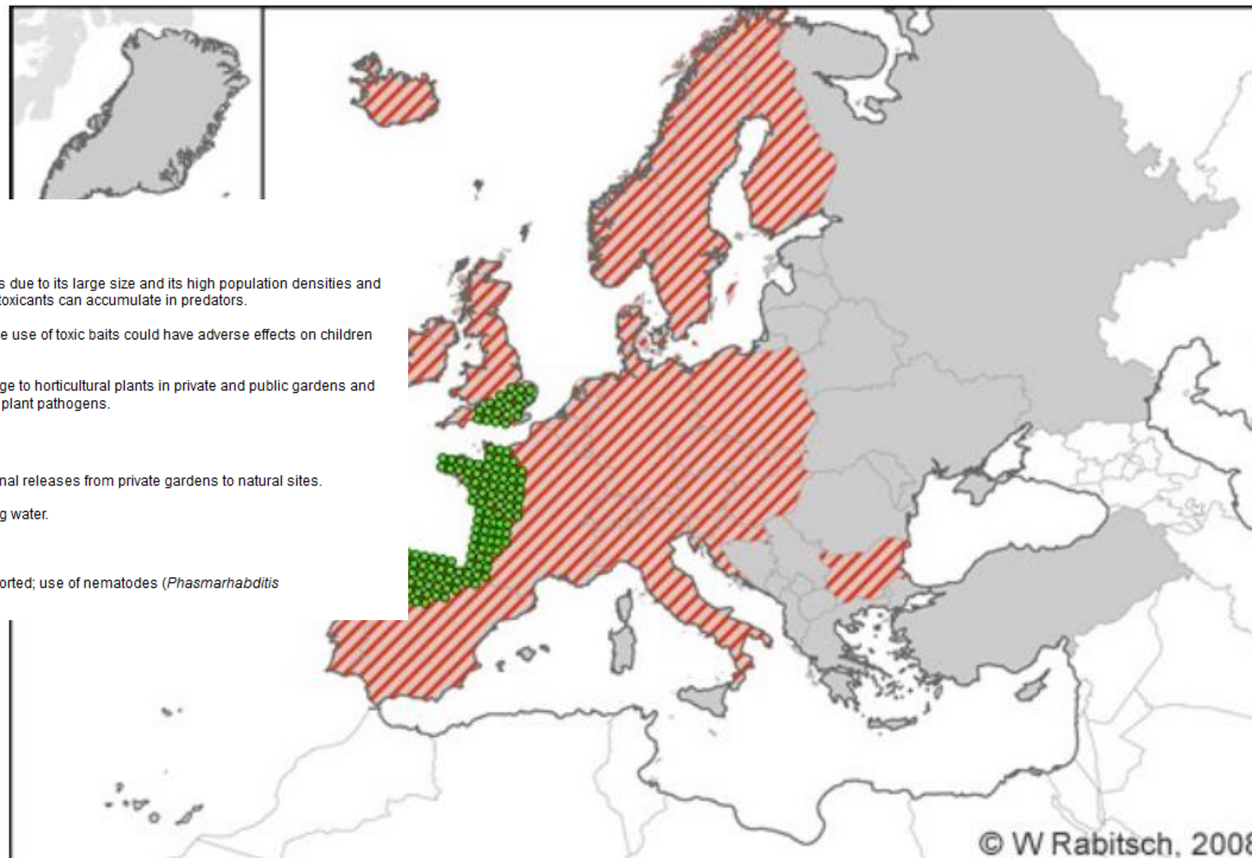
Introduction Pathway

The slug was unintentionally introduced with plant material, package and waste materials. Because of scattered first records across Europe, several independent introduction events are presumed.

Distribution

- Native Range
  - Southwest Europe (parts of Spain, France, UK)
- Known Introduced Range
  - Large parts of central and the southern part of northern Europe, USA (since 1998)
- Trend
  - In Europe, increasing in abundance, distributional and altitudinal range

Distribution Map

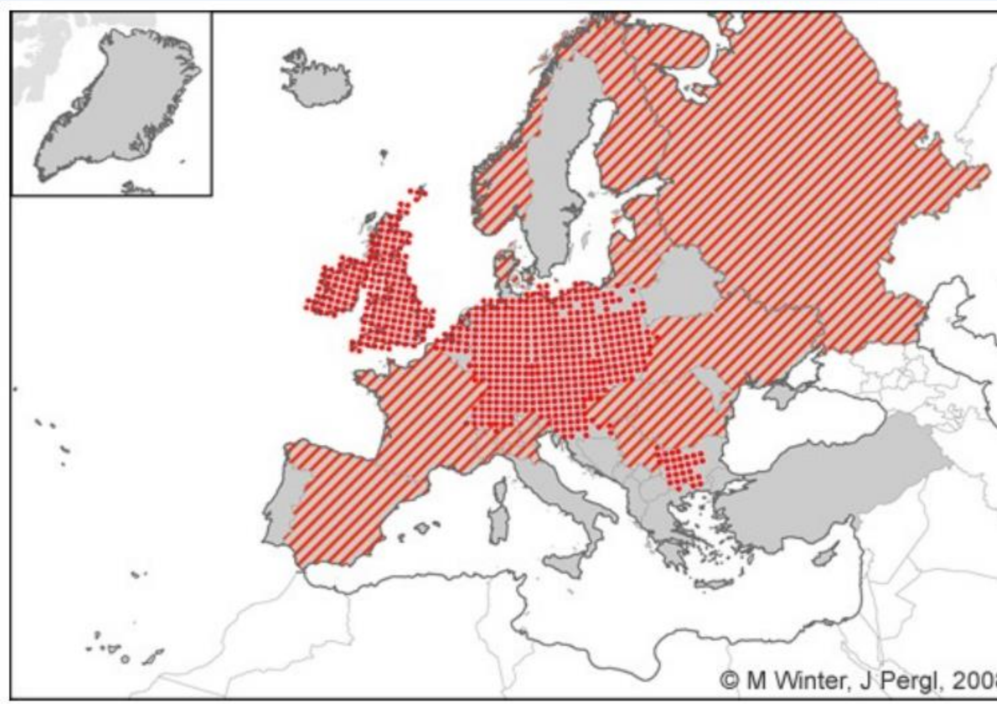


Impact

- Ecosystem Impact
  - It is an important plant defoliator. Outcompetes native slug species due to its large size and its high population densities and hybridises with the native *A. ater*. If combatted with toxic baits, the toxicants can accumulate in predators.
- Health and Social Impact
  - It is an intermediate host of nematode parasites affecting pets. The use of toxic baits could have adverse effects on children and pets in private gardens.
- Economic Impact
  - It is the most important slug pest in Europe causing severe damage to horticultural plants in private and public gardens and cultivated crops in agriculture. It is also known for transmission of plant pathogens.

Management

- Prevention
  - Screening of introduced plant material and packaging. No intentional releases from private gardens to natural sites.
- Mechanical
  - Traps; slug fences; collecting by hand and killing slugs with boiling water.
- Chemical
  - Several toxicants (e.g., Metaldehyds, Carbamates) are available.
- Biological
  - Providing near-natural habitats so that natural predators are supported; use of nematodes (*Phasmarhabditis hermaphrodita*) as biocontrol agents.



Impatiens glandulifera

Description
Ecology & Habitat
Distribution
Impact and Management
Contributors and Experts
References and Links
Download Factsheet

Impact

- Ecosystem Impact
  - Studies published so far suggest that although *I. glandulifera* reduces the diversity of invaded communities, this reduction concerns mostly widespread weed and even other non?native species. It is also expected to successfully compete for pollinators, e.g. with *Stachys palustris*.
- Health and Social Impact
  - The species is capable of changing the appearance of riverbanks completely, especially when in bloom.
- Economic Impact
  - There is some speculation that when *I. glandulifera* usurps the dominance in riparian vegetation it can promote erosion due to its modest root system, especially compared to the clonal native dominants of these communities, such as *Urtica dioica*.

Management

- Prevention
  - Reducing its use as an ornamental, especially in wet areas.
- Mechanical
  - Mechanical eradication efforts sometimes take place, especially in areas of high conservation interest. Due to the modest root system, the whole plant can be removed easily. However, the effect of such attempts is rather questionable due to the effective transportation of seeds through the river corridor, which usually results in a quick reinvasion.
- Chemical
  - Juvenile plants respond to spraying by herbicides, however, when the flowering plants are sprayed, they are still able to produce viable seeds.
- Biological
  - Unknown.

Species Factsheet

Spartina anglica

Description
Ecology & Habitat
Distribution
Impact and Management
Contributors and Experts
References and Links
Download Factsheet

Impact

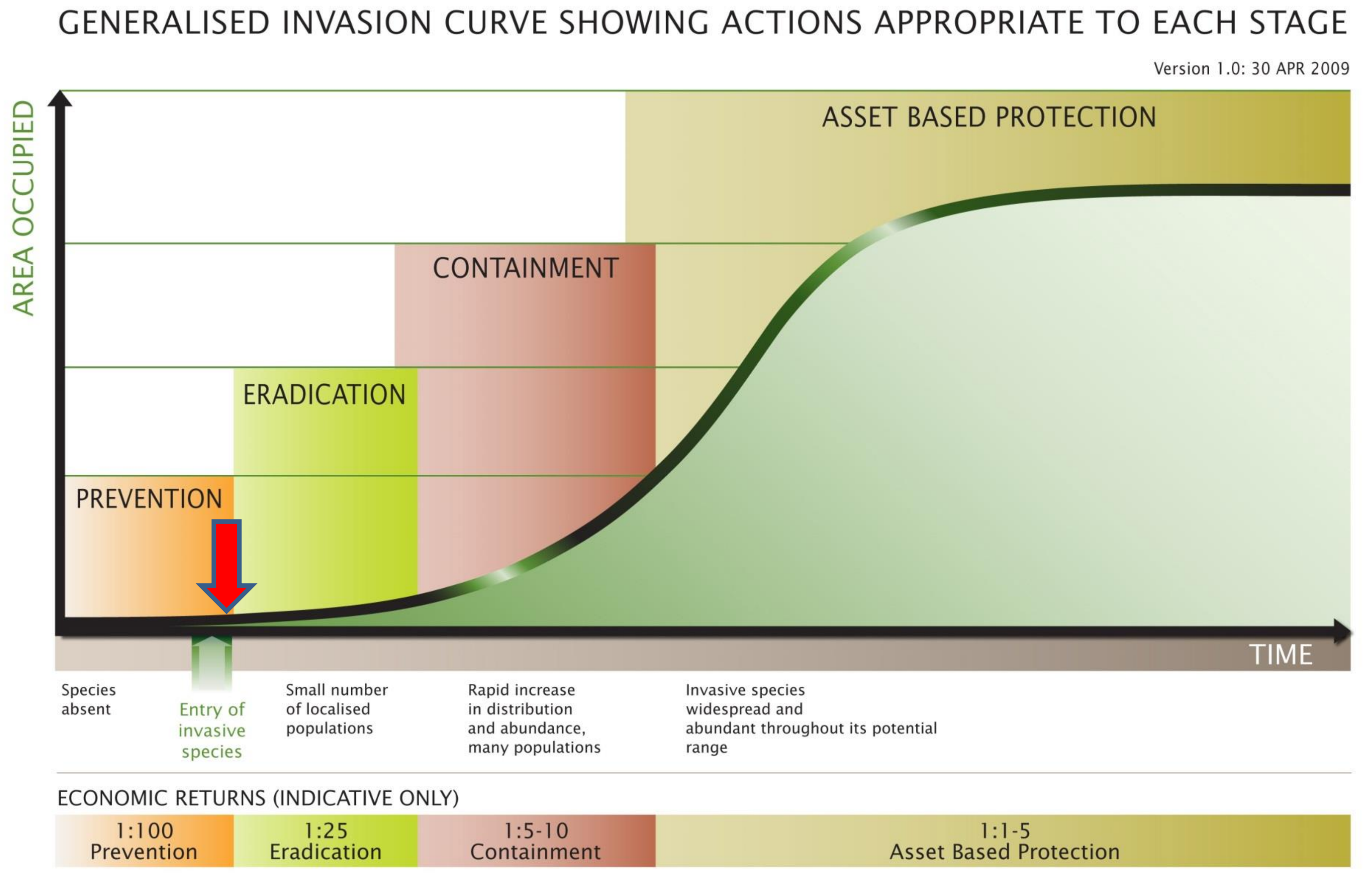
- Ecosystem Impact
  - It is recognized as an important environmental modifier. It has resulted in replacement of *S. maritima* and exclusion of native flora, such as *Salicornia* spp., *Zostera* sp. and benthic infauna, with consequences for some wildfowl and waders.
- Health and Social Impact
  - May compete with areas used for oyster farming and impede recreational activities.
- Economic Impact
  - Used to stabilize tidal mud flats for land reclamation. May have potential as a biofuel, paper and as a food product for animals.

Management

- Prevention
  - Plants should not be transplanted, for example when used unnecessarily for land reclamation projects. In some world regions *S. anglica* is prohibited for sale or distribution.
- Mechanical
  - Smothering with plastic has resulted in success over small areas, and removal by digging out plants at an early stage has also been successful. Attempts to control it as a fodder for cattle have failed.
- Chemical
  - Chemical herbicides applied to large areas have been more successful with two time-separated applications.
- Biological
  - Biological control using a planthopper *Prokelisia marginata* is being implemented on the Pacific coast of North America for the parental species *S. alternifolia*.

This website was developed with support from the European Commission under the Sixth Framework Programme through the DAISIE project - Contract Number: SSPI-CT-2003-511202. **Leave Feedback**

Fáze kolonizace prostředí invazivními druhy



Vliv zavlečených a invazivních druhů na biodiverzitu

- Kompetice o životní prostor a zdroje
- Predace
- Rozšíření nových chorob
- Destrukce životního prostoru
- Hybridizace a introgrese

Invasive and Exotic Plants

The following species have been listed on an invasive species list or noxious weed law in North America. For more information on each species, including the listing sources, images, and publication links, click on the species.

Browse List:

Browse Habit:

Full List - 1627 Species

Subject Name	Scientific Name ↓	Family	Order
rosarypea	*Abrus precatorius* L.	Fabaceae (Leguminosae)	Fabales
hairy Indian mallow	*Abutilon grandifolium* (Willd.) Sweet	Malvaceae	Malvales
velvetleaf	*Abutilon theophrasti* Medik	Malvaceae	Malvales
earleaf acacia	*Acacia auriculiformis* A. Cunningham ex Benth.	Fabaceae (Leguminosae)	Fabales
small Philippine acacia	*Acacia confusa* Merr	Fabaceae (Leguminosae)	Fabales
cyclops acacia	*Acacia cyclops* A. Cunn. ex G. Don	Fabaceae (Leguminosae)	Fabales
silver wattle	*Acacia dealbata* Link	Fabaceae (Leguminosae)	Fabales
Sydney golden wattle	*Acacia longifolia* (Andr.) Willd.	Fabaceae (Leguminosae)	Fabales
black wattle	*Acacia mearnsii* de Wildeman.	Fabaceae (Leguminosae)	Fabales

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OP Vzdělávání pro konkurenceschopnost
INVESTICE DO ROZVOJE VZDĚLÁVÁNÍ

Invasive and Exotic Insects

The following species have been listed on an invasive species list in North America. For more information on each species, including the listing sources, images, and publication links, click on the species.

483 Records

Subject Name	Scientific Name ↓	Family	Order
pine false webworm	*Acantholyda erythrocephala* (Linnaeus)	Pamphiliidae	Hymenoptera
strawberry tortrix	*Acleris comariana* (Lienig & Zeller)	Tortricidae	Lepidoptera
leek moth	*Acrolepiopsis assectella* (Zeller)	Plutellidae	Lepidoptera
balsam woolly adelgid	*Adelges piceae* (Ratzeburg)	Adelgidae	Hemiptera
hemlock woolly adelgid	*Adelges tsugae* Annand	Adelgidae	Hemiptera
Chinese rose beetle	*Adoretus sinicus* Burmeister, 1855	Scarabaeidae	Coleoptera
scarab beetles	*Adoretus spp.* Laporte 1840	Scarabaeidae	Coleoptera
summer fruit tortrix moth	*Adoxophyes orana* (Fischer von Roslerstamm)	Tortricidae	Lepidoptera
northwest coast mosquito	*Aedes aboriginis* Dyar, 1917	Culicidae	Diptera
Asian tiger mosquito	*Aedes albopictus* (Skuse, 1895)	Culicidae	Diptera
wheat stink bug	*Aelia rostrata* Boheman	Pentatomidae	Hemiptera
city longhorn beetle	*Aeolesthes sarta* (Solsky, 1871)	Cerambycidae	Coleoptera
small hive beetle	*Aethina tumida* Murray, 1867	Nitidulidae	Coleoptera
alder leaf beetle	*Agelastica alni alni* (Linnaeus, 1758)	Chrysomelidae	Coleoptera
Oriental leaf beetle	*Agelastica alni orientalis* Baly, 1878	Chrysomelidae	Coleoptera
oak splendour beetle	*Agrilus biguttatus* (Fabricius, 1776)	Buprestidae	Coleoptera
goldspotted oak borer	*Agrilus coxalis auroguttatus* Schaeffer, 1905	Buprestidae	Coleoptera

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Erythrina tahitensis

Species Status

Critically Endangered

Invasive Species Threat Summary

Erythrina tahitensis is classified as 'Critically Endangered (CR)' in the IUCN Red List of Threatened Species. It is endemic to Tahiti in the Society Islands, French Polynesia (Florence, 1998).

Approximately 70% of Tahiti's endemic plant species occur in wet upland forests, where the primary threat encountered is the uncontrolled spread of invasive alien plants (Meyer, 2004). ***Miconia calvescens*** is the principal invader of the Society Islands, including Tahiti and thus constitutes a major threat to *E. tahitensis*. *M. calvescens* forms impenetrable monotypic stands, and its broad leaves severely reduce light levels in the understorey, which has adverse impacts on many native plant species (Meyer, 1996). Other invasive animals have also contributed to the spread of the weed through frugivory and seed dispersal; examples of introduced seed dispersers of *M. calvescens* are: the silvereye (*Zosterops lateralis*), the red-vented bulbul (***Pycnonotus cafer***), the Pacific rat (***Rattus exulans***) (Meyer, 1996), as well as feral goats (***Capra hircus***) (Meyer, 2004).

Other invasive plant species present on Tahiti and potentially affecting *E. tahitensis* include: ***Lantana camara***, which forms dense stands shading out other natives, ***Ardisia elliptica***, and the rose apple (***Syzygium jambos*** (Meyer, 2004).

Organism Type
Plant

Taxonomy

Kingdom:	Plantae
Phylum:	Tracheophyta
Class:	Magnoliopsida
Order:	Fabales
Family:	Leguminosae
Genus:	Erythrina
Species:	*Erythrina tahitensis*

Species Authority: Nadeaud

Biome
Terrestrial

Invasive Species Management Summary

Control of *M. calvescens*, which involved the release of a defoliating fungal pathogen *Colletotrichum gloeosporioides* led to severe leaf damage and seedling mortality of the weed. Long-term monitoring showed a general increase in native and endemic species richness and plant cover in treated plots (Meyer, 2012).

Species Impact

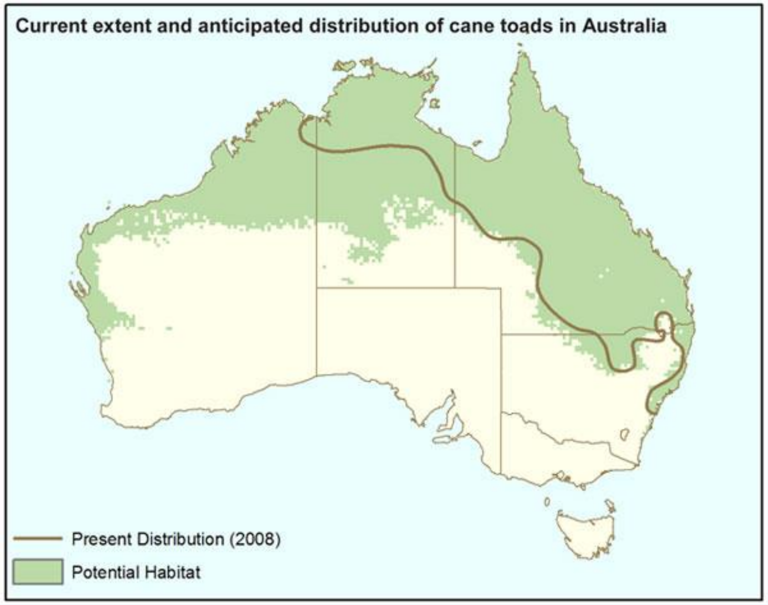
Refresh |

Threatened Species	Species Status	Invasive Species	Impact Mechanism	Impact Outcome	Count of Species Locations
Erythrina tahitensis	Critically Endangered	*Ardisia elliptica*	Competition	Decline in population	1
Erythrina tahitensis	Critically Endangered	*Lantana camara*	Competition	Decline in population	1
Erythrina tahitensis	Critically Endangered	*Miconia calvescens*	Competition	Decline in population	1
Erythrina tahitensis	Critically Endangered	*Syzygium jambos*	Competition	Decline in population	1
Erythrina tahitensis	Critically Endangered	*Capra hircus*	Grazing/herbivory/browsing	Habitat degradation	1
Erythrina tahitensis	Critically Endangered	*Rattus exulans*	Interaction with other invasive species	Other	1
Erythrina tahitensis	Critically Endangered	*Capra hircus*	Interaction with other invasive species	Other	1
Erythrina tahitensis	Critically Endangered	*Pycnonotus cafer*	Interaction with other invasive species	Other	1
Erythrina tahitensis	Critically Endangered	*Zosterops lateralis*	Interaction with other invasive species	Other	1
Erythrina tahitensis	Critically Endangered	*Capra hircus*	Trampling	Habitat degradation	1

IBIS: Island Biodiversity and Invasive Species

Evoluce původních druhů v odezvě na zavlečené druhy

Rhinella marina



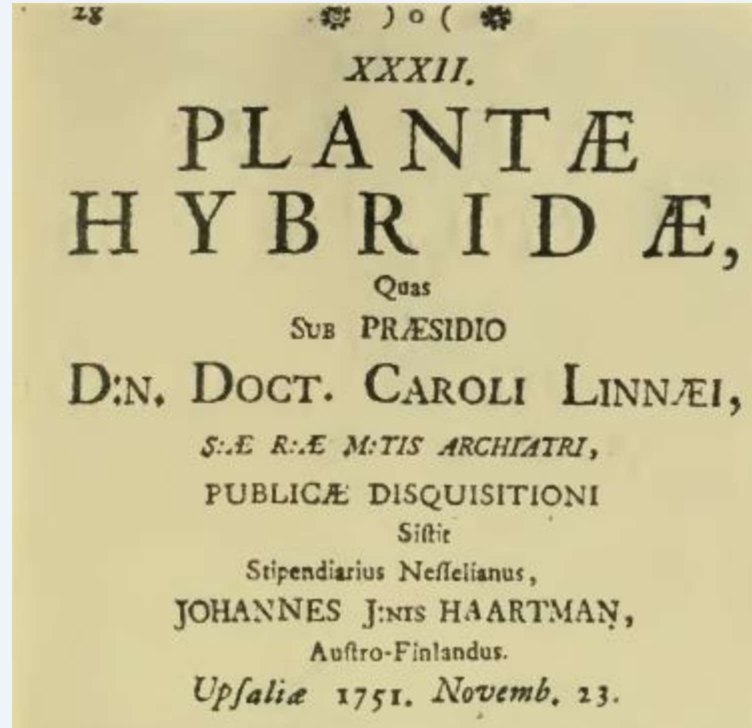
Dovezena v roce 1935 z Havaje, pro kontrolu škůdců napadajících cukrovou třtinu.

The toads are born conquerors. Females can lay 35,000 eggs many times a year, and each can develop into a new frog in less than 10 weeks. They're unfussy eaters and they'll munch away on bird eggs, smaller native frogs and more. And they have large glands behind their heads, which secrete a milky poison. Local predators (or domestic pets) that try to eat them tend to die.

Hybridizace mezi zavlečenými a původními druhy

Carl von Linne *(Carolus Linnaeus)*

(1707 – 1778)



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XXXII.

PLANTÆ HYBRIDÆ,

Quas

SUB PRÆSIDIO

D:N. DOCT. CAROLI LINNÆI,

S:Æ R:Æ M:TIS ARCHIATRI,

PUBLICÆ DISQUISITIONI

Siftit

Stipendiarius Neflelianus,

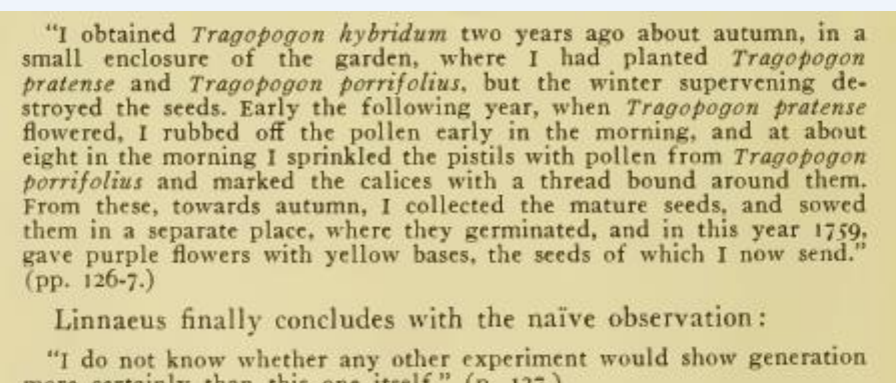
JOHANNES J:NIS HAARTMAN,

Auftro-Finlandus.

Upfaliæ 1751. *Novemb.* 23.

1757 – popis prvního vědecky doloženého hybrida
Tragopogon pratensis x T. porrifolius

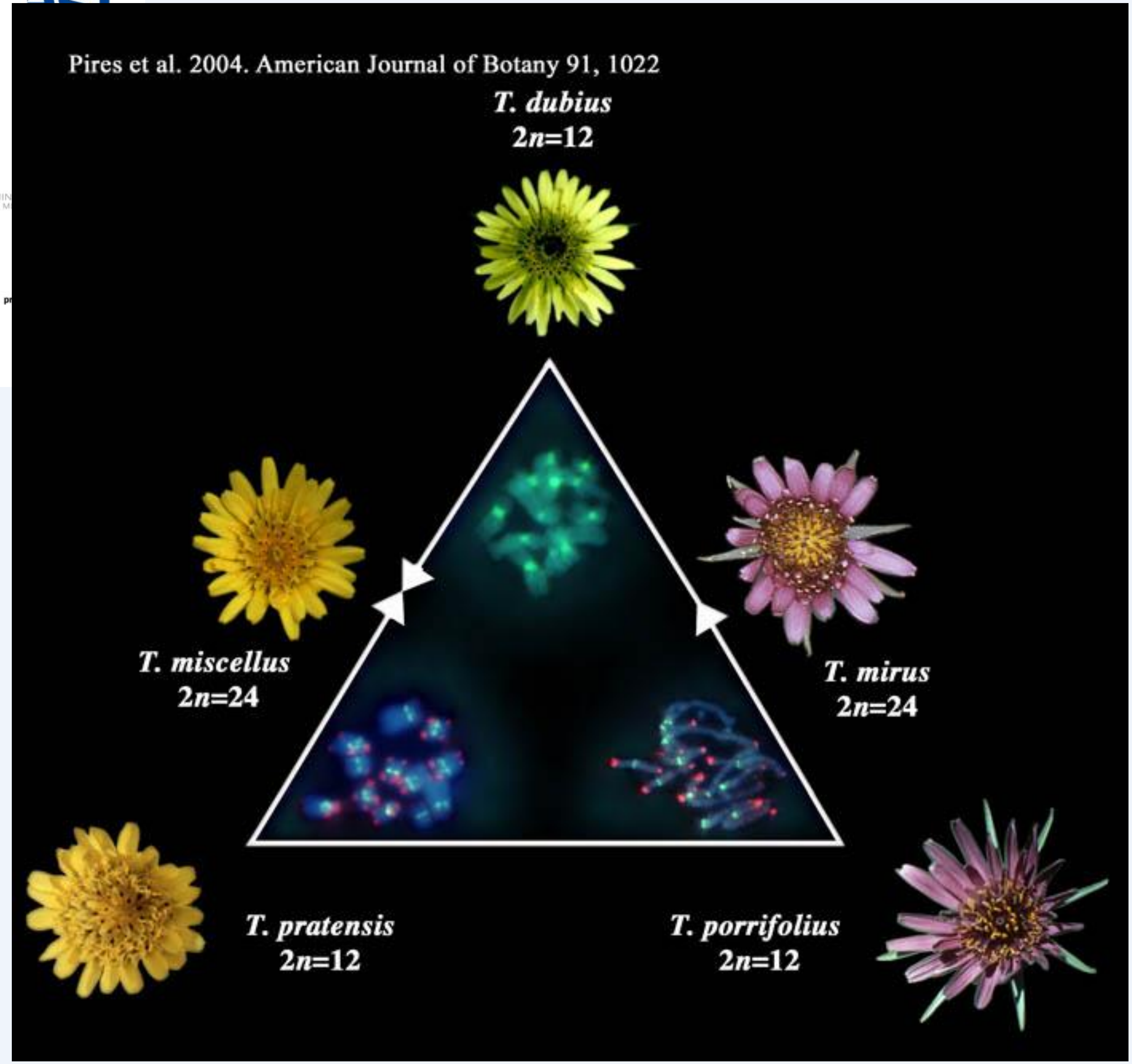
1760 – cena akademie v Petrohradě
význam i pro sexualitu u rostlin



"I obtained *Tragopogon hybridum* two years ago about autumn, in a small enclosure of the garden, where I had planted *Tragopogon pratense* and *Tragopogon porrifolius*, but the winter supervening destroyed the seeds. Early the following year, when *Tragopogon pratense* flowered, I rubbed off the pollen early in the morning, and at about eight in the morning I sprinkled the pistils with pollen from *Tragopogon porrifolius* and marked the calices with a thread bound around them. From these, towards autumn, I collected the mature seeds, and sowed them in a separate place, where they germinated, and in this year 1759, gave purple flowers with yellow bases, the seeds of which I now send." (pp. 126-7.)

Linnaeus finally concludes with the naïve observation:

"I do not know whether any other experiment would show generation more certainly than this one itself." (p. 127.)



Diploidní druhy
2n = 2X = 12
evropské druhy zavlečené do Severní Ameriky
T. dubius, T. pratensis, a*T. porrifolius*

Ownby (1950) první pozorování hybridů v oblasti Palouse států Washington a Idaho

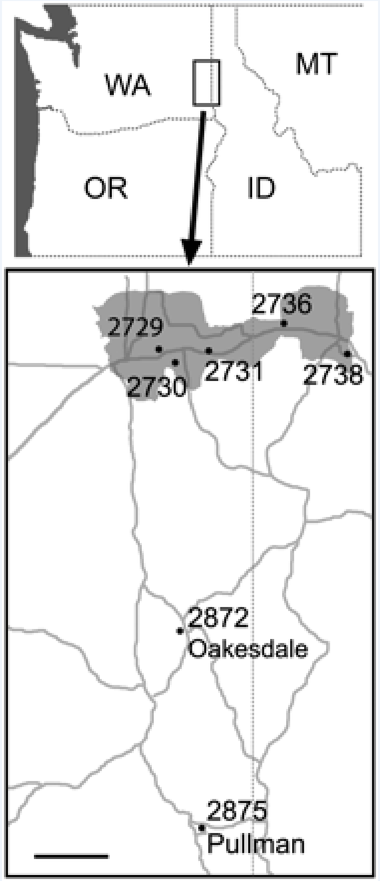
F1 hybridi jsou sterilní

Ale tetraploidní hybridi
2n= 4x = 24
jsou fertilní a reprodukčně isolovaní od rodičovských druhů

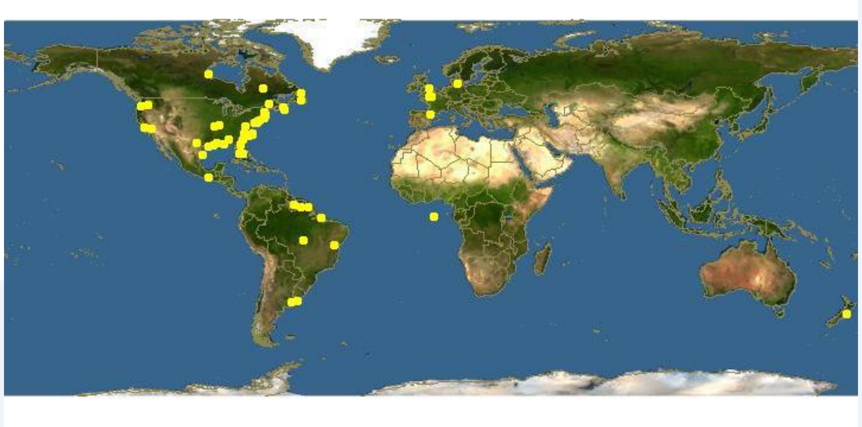
Vznik vícenásobně

Hybridní druhy *Tragopogon*

Soltis et al. (1995) pomocí molekulárních markerů zjistil, že *T. miscellus* vznikl nejméně 9-13x a *T. mirus* 7-11x.
Častá polyploidizace během velmi krátké doby (50-60 let) od zavlečení.



hybridní *Spartina*



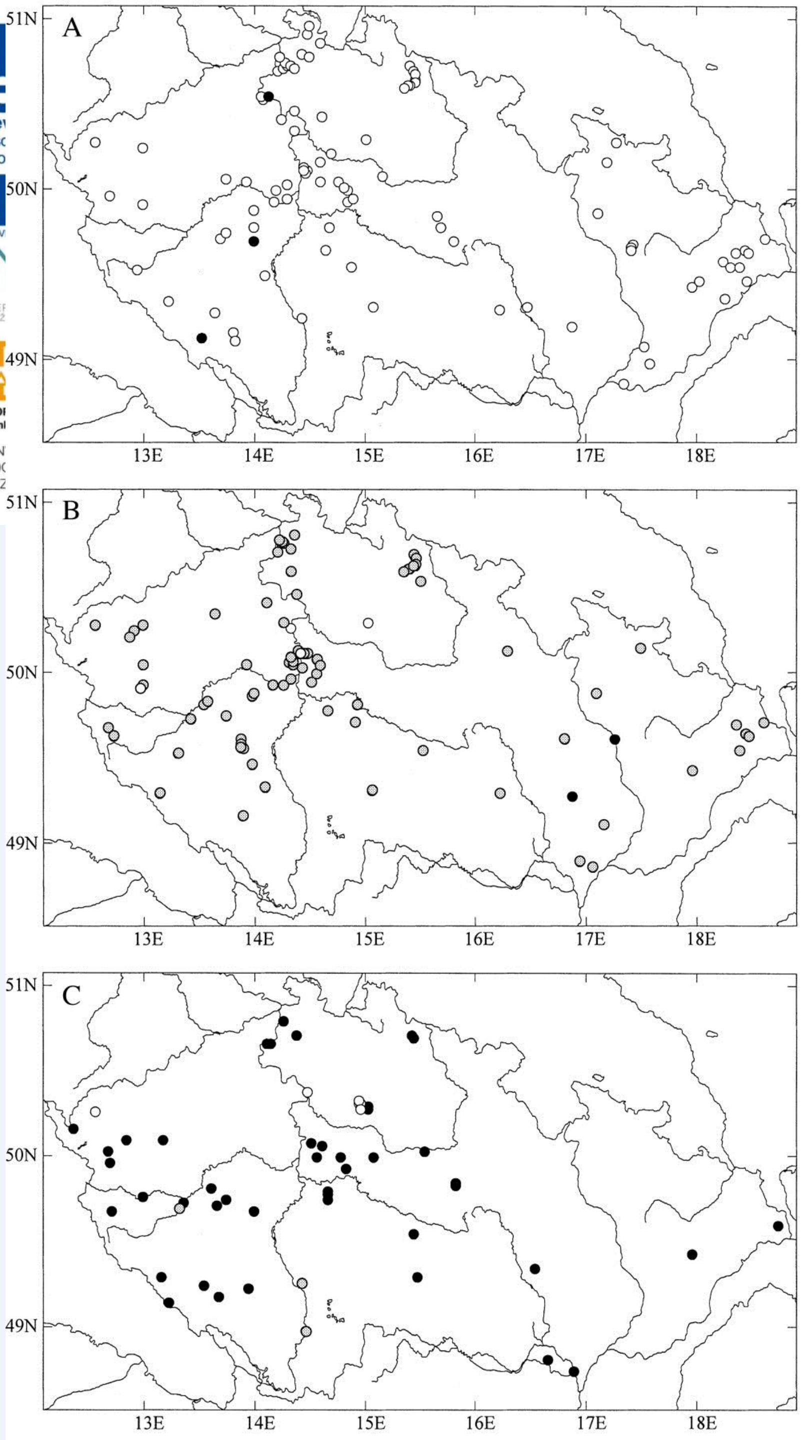
Spartina - *S.alterniflora* × *townsendii* (*S. alterniflora*× *S. maritima*)

Evropský druh *Spartina maritima* (2n = 2X = 60) v roce 1870 přišla do kontaktu se zavlečených americkým druhem *S. alterniflora* (2N = 2X = 62).
Vznikl amfidiploidní druh *S. x townsendii* (2n = 2X = 62), který byl sterilní (Marchant 1963, 1966).

V okolí anglického Southamptonu vznikl alloploid *S. anglica* (2n = 4X = 120, 122, or 124), ktery byl fertilní.
Další, pravděpodobně reciproční hybrid *S. x neyrautii* byl nalezel v roce1892 ve Francii.

Spartina anglica

Reynoutria x bohemica

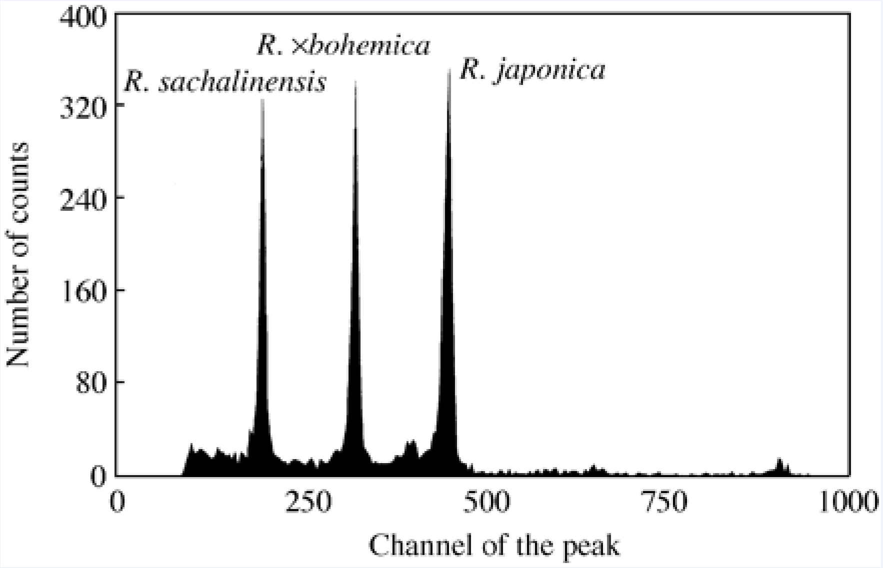


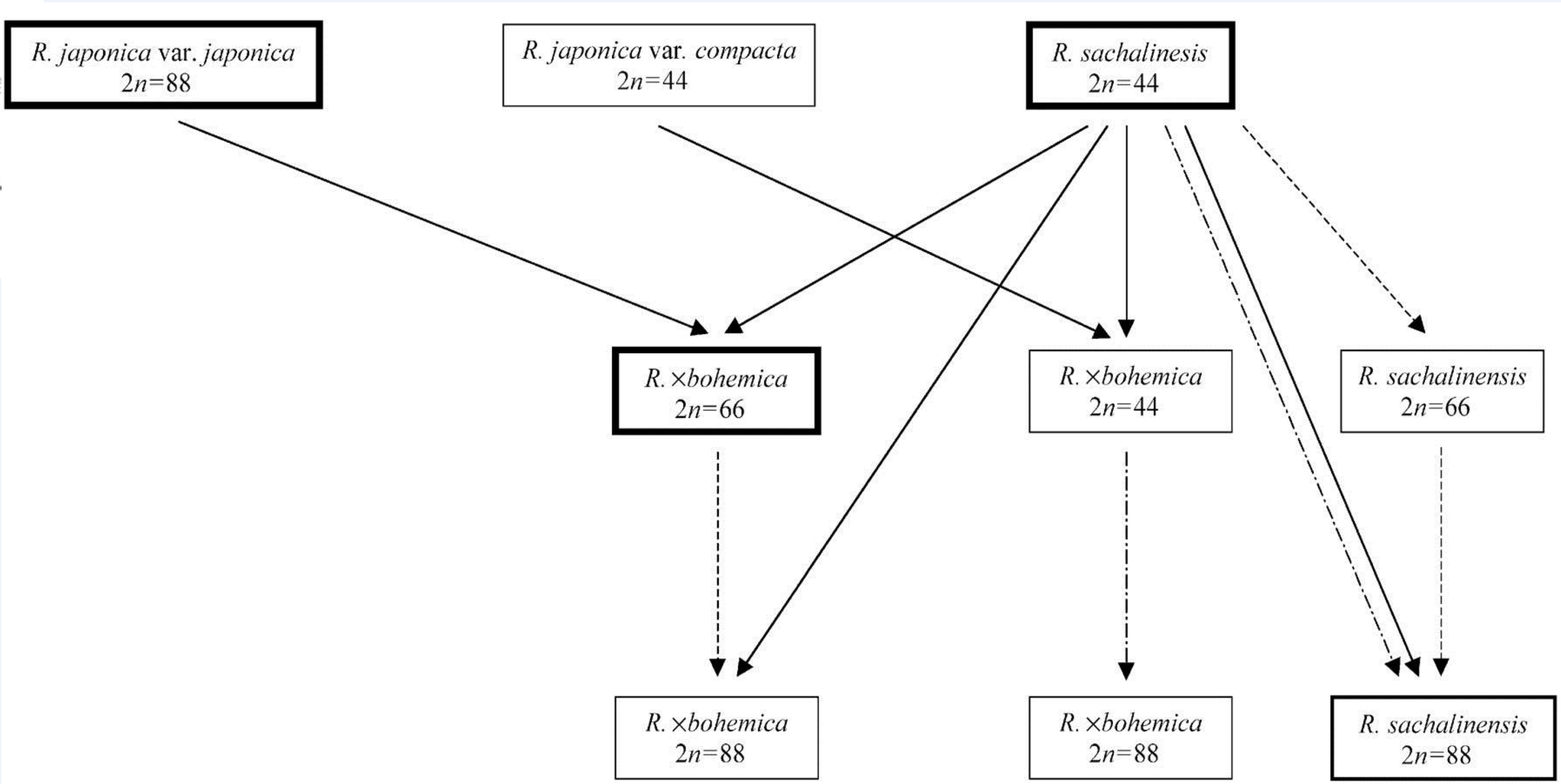
Variation in DNA-ploidy Levels of *Reynoutria* Taxa in the Czech Republic

Mandák et al. *Ann Bot (2003) 92 (2): 265-272*

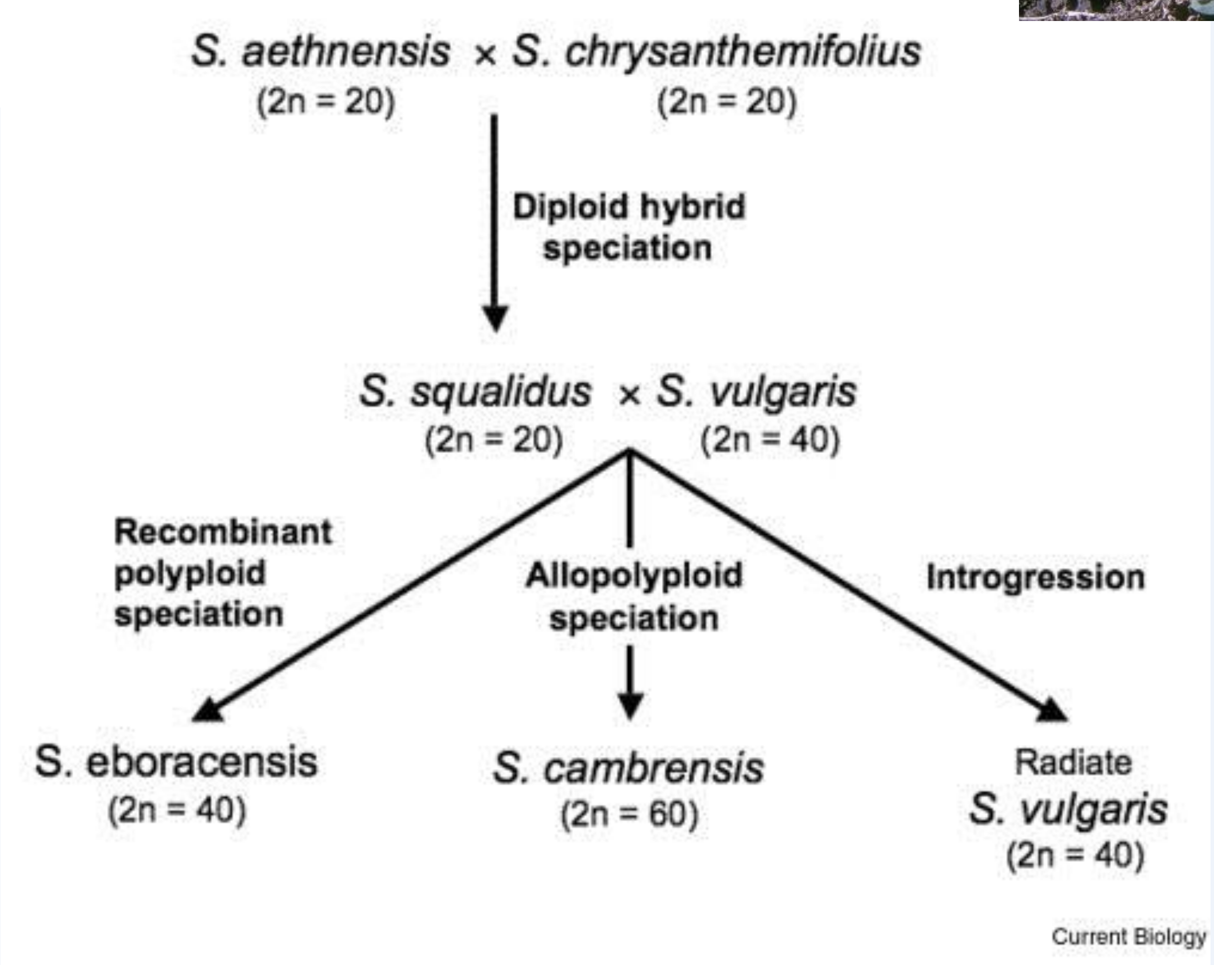
Distribution of the 257 *Reynoutria* clones used in this study. A, *Reynoutria japonica* var. *japonica* (white circles) and *R. japonica* var. *compacta* (black circles). B, *R. ×bohemica*; C, *R. sachalinensis*.

Black circles indicate tetraploids (2*n* = 44),
grey circles hexaploids (2*n* = 66),
and open circles octoploids (2*n* = 88).

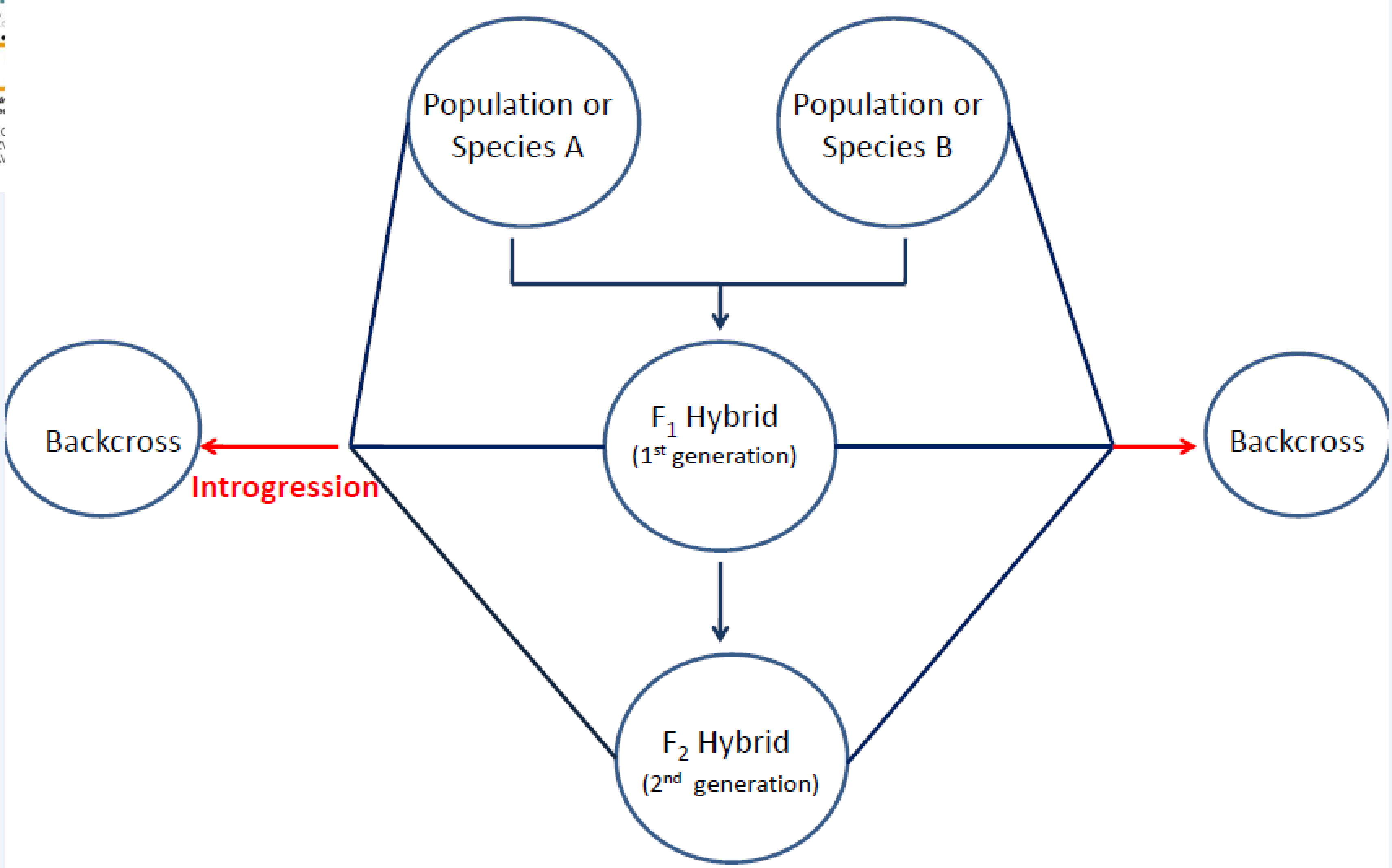



R. japonica var. japonica 2n=88
R. japonica var. compacta 2n=44
R. sachalinesis 2n=44
R. ×bohemica 2n=66
R. ×bohemica 2n=44
R. sachalinensis 2n=66
R. ×bohemica 2n=88
R. ×bohemica 2n=88
R. sachalinensis 2n=88

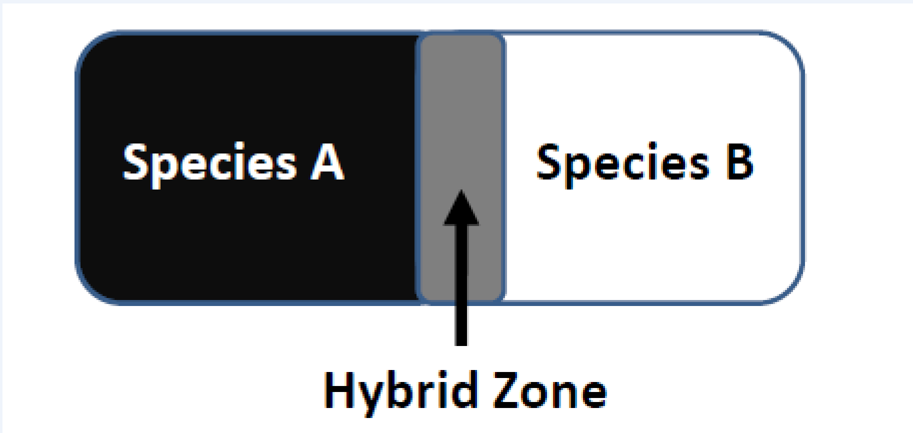
příklad *Senecio*

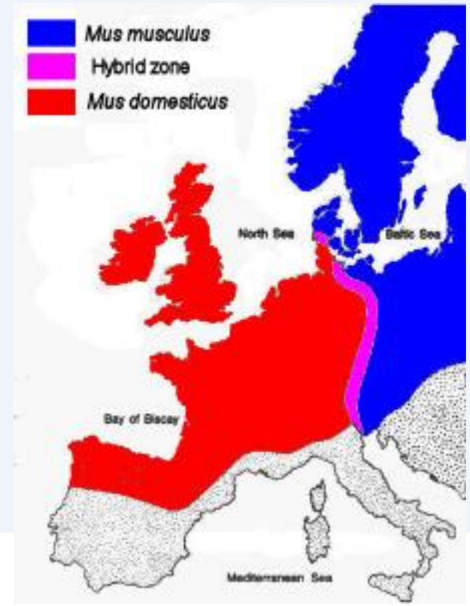


Míra hybridizace



Hybridní zóny mezi druhy v přírodě

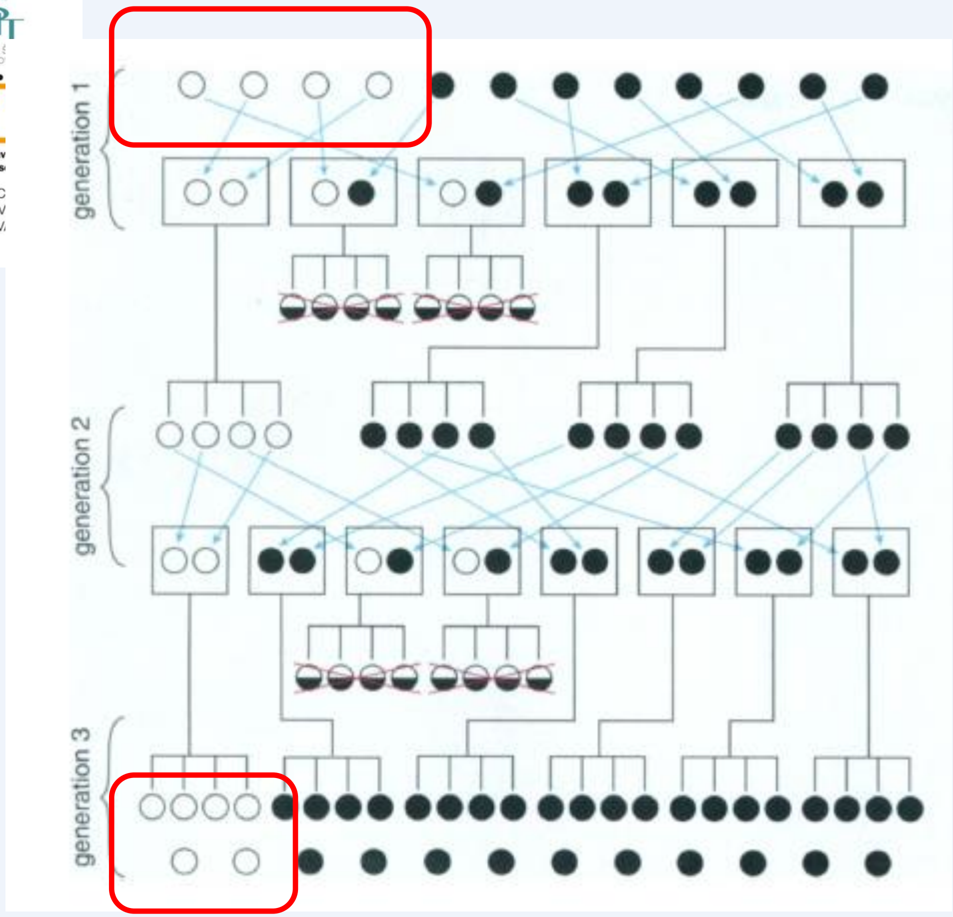




How are hybrid zones maintained?

- Hybrids may be less fit than parental taxa and selected against, but dispersal into the zone maintains a narrow band of F_1's
- Hybrids may be more fit than parental taxa in habitats that are intermediate to parental taxas' native habitat

Hybridizace se zavlečenými příbuznými druhy

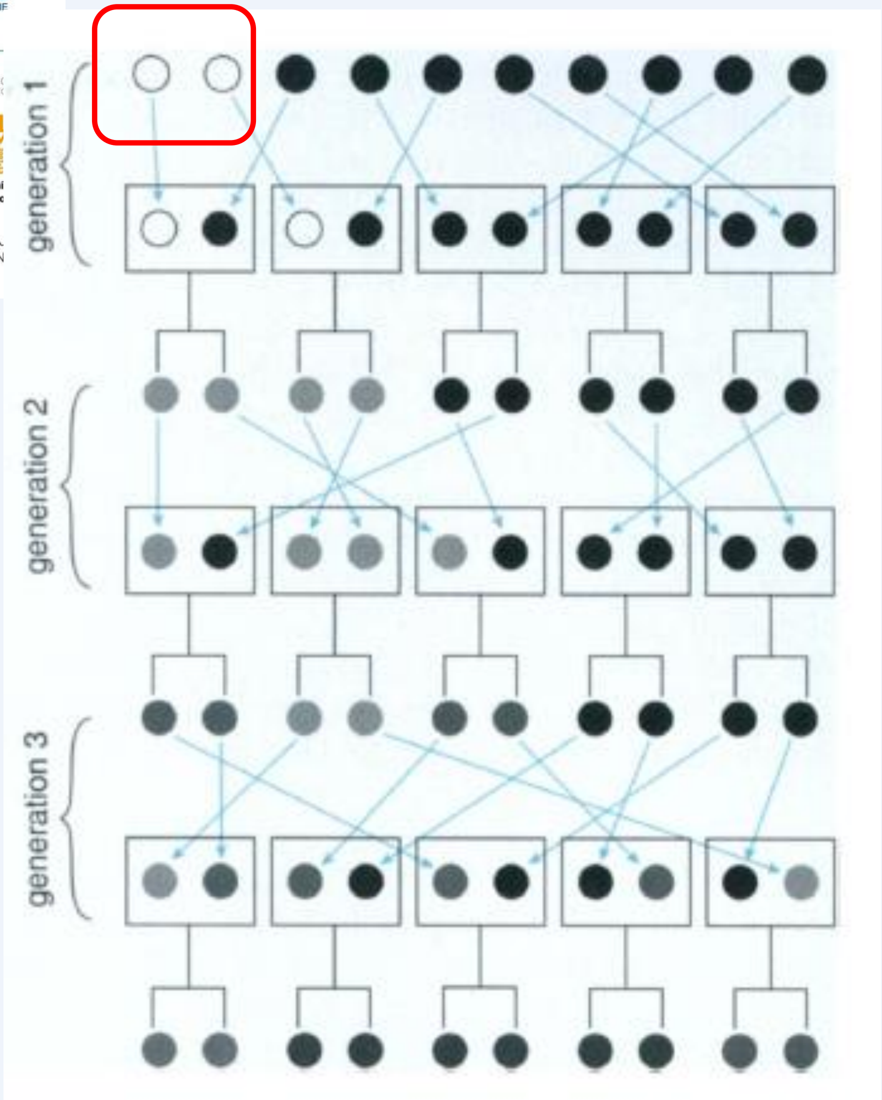


Vznik hybridů, kteří jsou buď sterilní, nebo žijí jen krátce bez podílu na reprodukci

Ale

„vyředění“ podílu vzácného druhu

Hybridizace a extinkce



Vznik hybridů, kteří jsou fertilní

Výsledek:
genetická eliminace druhu

Example of Genetic Extinction

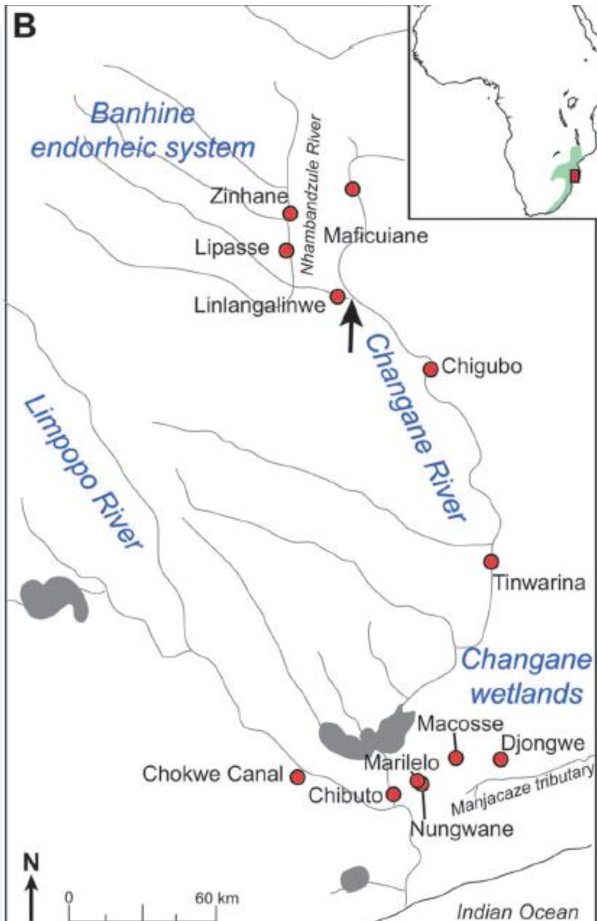
Cichlid fish in Lake Victoria

- Increased turbidity in Lake Victoria due to agriculture and deforestation
- Cichlids use visual cues to identify conspecifics for mating
- Matings between species are now common and seriously threatened this classic example of adaptive radiations (almost half of cichlid species are believed to be extinct)

OPEN ACCESS Freely available online PLOS ONE

Successive Invasion-Mediated Interspecific Hybridizations and Population Structure in the Endangered Cichlid *Oreochromis mossambicus*

Cyril Firmat[1,2*], Paul Alibert[1], Michèle Losseau[3], Jean-François Baroiller[4], Ulrich K. Schliewen[5]



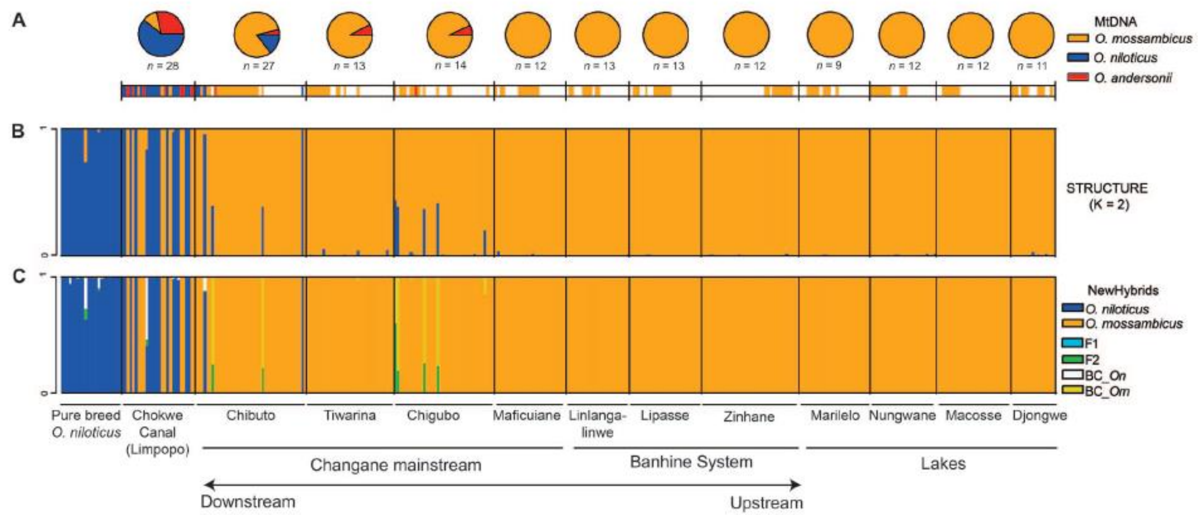


Figure 2. Distribution of mitochondrial haplotypes and AFLP genotypes in the Changane-Lower Limpopo system. A. Pie charts of

Contributed Paper

Spontaneous Interspecific Hybridization and Patterns of Pollen Dispersal in Ex Situ Populations of a Tree Species (*Sinojackia xylocarpa*) that is Extinct in the Wild

JIN-JU ZHANG,*§ QI-GANG YE,*§ XIAO-HONG YAO,*‡ AND HONG-WEN HUANG*†‡

*Wuhan Botanical Garden/Wuhan Institute of Botany, Chinese Academy of Sciences, Wuhan 430074, Hubei, China
†South China Botanical Garden/South China Institute of Botany, Chinese Academy of Sciences, Guangzhou 510650, Ch

Abstract: *For endangered plants interspecific hybridization occurring in ex situ collections may lead to failure of reintroduction actions. We used* Sinojackia xylocarpa*, a well documented Chinese endemic species that is extinct in the wild, as a model case to address this concern. We used paternity analyses to assess the spontaneous hybridization and patterns of pollen flow between* S. xylocarpa *and its congener species,* S. rehderiana*, in conserved populations in Wuhan Botanic Garden. Interspecific hybridization events were detected in seven out of eight maternal trees of* S. xylocarpa*, and an average of 32.7% seeds collected from maternal trees of* S. xylocarpa *were hybrids. The paternity of 93 out of 249 seedlings from* S. xylocarpa *assigned to* S. rehderiana *provided convincing evidence that spontaneous interspecific hybridization occurred extensively in the living garden collection we studied. Different patterns of pollen dispersal (predominantly short-distance vs. long-distance pollination) were observed between intra- and interspecific hybridization events in the garden. Pollen dispersal within the ex situ populations was not restricted by distance, as evidenced by a lack of significant correlations between the average effective pollen dispersal distance (δ) and the geographic distances (d1 and d2) between maternal and paternal trees. The interspecific pollen-dispersal distance ranged from 10 to 620.1 m (mean 294.4 m). Such extensive hybridization in ex situ collections could jeopardize the genetic integrity of endangered species and irrevocably contaminate the gene pool if such hybrids are used for reintroduction and restoration. We recommend strongly that measures be taken to minimize the genetic risks of this kind of hybridization, including establishing buffer zones in ex situ collections, manipulating flowering phenology, testing seed lots before use in reintroduction programs, and controlling pollination for seed purity.*

A cautionary tale: botanical gardens and the hybridization of endangered species

Botanical gardens play an important role in conserving plant species that are highly endangered or even extinct in the wild. But as a new study shows, botanical gardens can pose their own dangers for these at-risk species, specifically from hybridization with other plants in the collection.

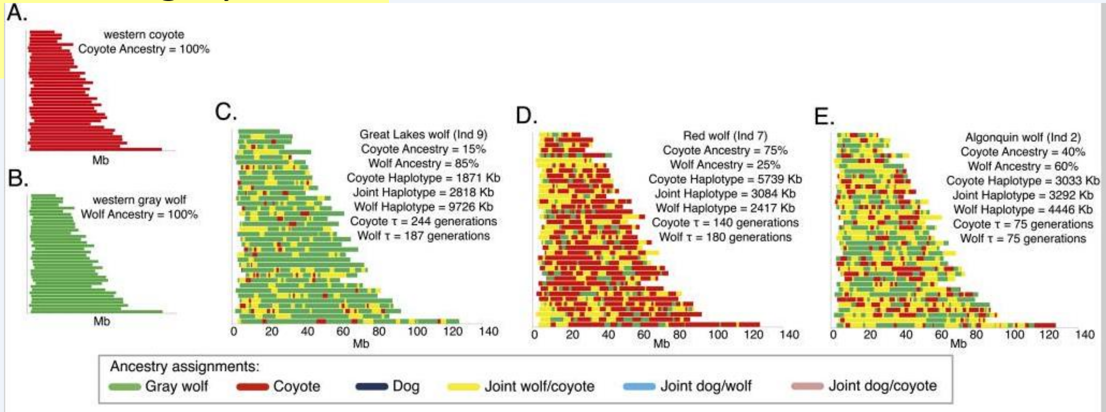
As the study notes, over 30% of rare or endangered plant species are conserved in living collections in 1800 botanical gardens worldwide.

Hybrid nebo samostatný druh ?
Canis rufus **(vlk rudohnědý)** vs. *Canis latrans* (kojot)

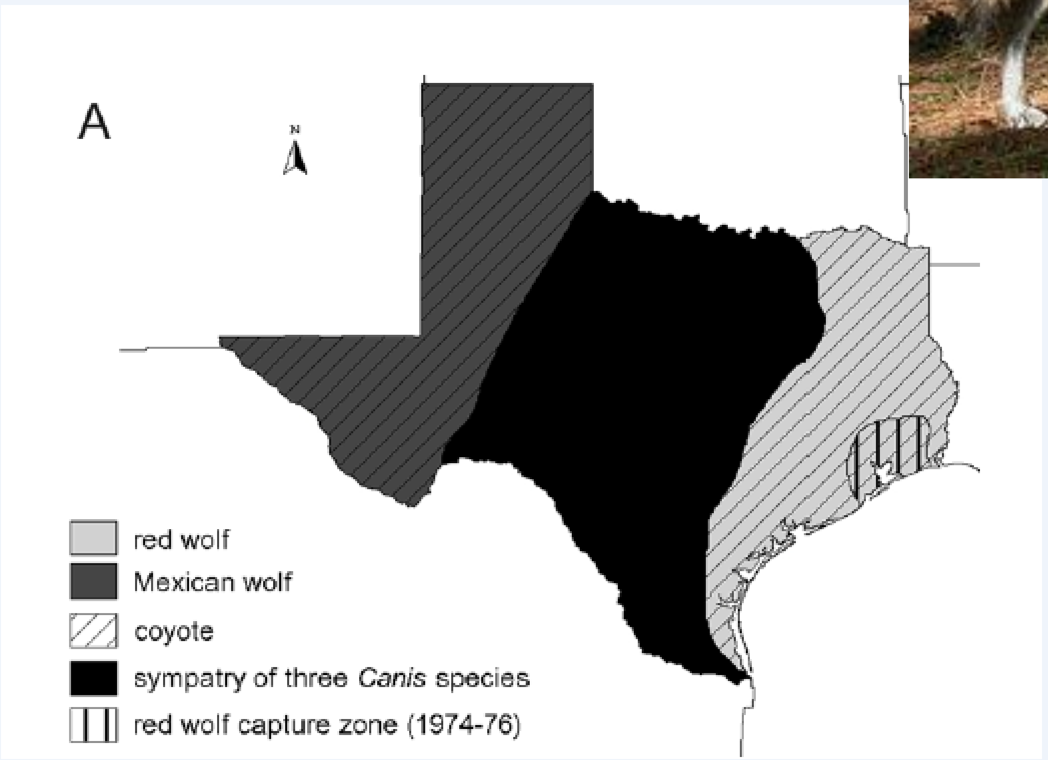
JV USA, v roce 1980 posledních 17 přeneseno do záchranného chovu

In May 2011, an analysis (48,000 SNP) of red wolf, Eastern wolf, gray wolf, and dog genomes suggested that the red wolf was **76–80 percent coyote and only 20–24 percent gray wolf,** suggesting that the red wolf is actually much more coyote in origin than the Eastern wolf.

However, X-Ray analysis of the 16 red wolf specimens used in the SNP study were later shown to be wolf-coyote hybrids via cranial morphometric analysis, rendering the finding that the red wolf was a gray wolf-coyote hybrid inaccurate.

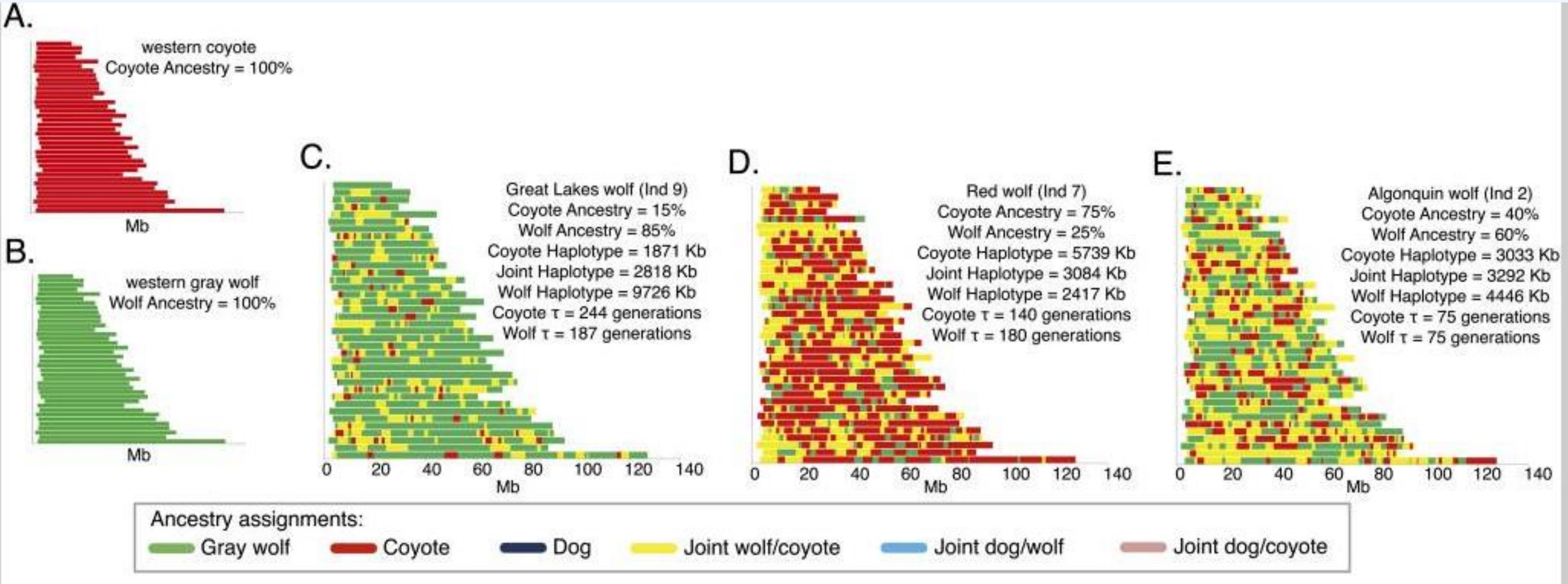


Canis rufus (vlk rudohnědý)



Canis rufus (vlk rudohnědý) = hybridní druh

In May 2011, an analysis (48,000 SNP) of red wolf, Eastern wolf, gray wolf, and dog genomes suggested that the red wolf was **76–80 percent coyote and only 20–24 percent gray wolf,** suggesting that the red wolf is actually much more coyote in origin than the Eastern wolf.



Animal Conservation. Print ISSN 1367-9430

Is the endangered Grevy's zebra threatened by hybridization?

J. E. Cordingley[1,2], S. R. Sundaresan[2,3,4], I. R. Fischhoff[2,4,5], B. Shapiro
D. I. Rubenstein[2,4]

Equus grevy, populace méně než 3000 jedinců v severní Kenyi a Ethiopii
46 chromosómů

Equus burchellii
Relativně běžný druh
44 chromosómů

Figure 1 Geographic range map of plains zebra *Equus burchelli* (shaded gray) and Grevy's zebra *Equus grevyi* (shaded black) in Kenya, with the location of Ol Pejeta Conservancy (white circle) shown (range maps adapted from Hack *et al.*, 2002; IUCN, 2008).

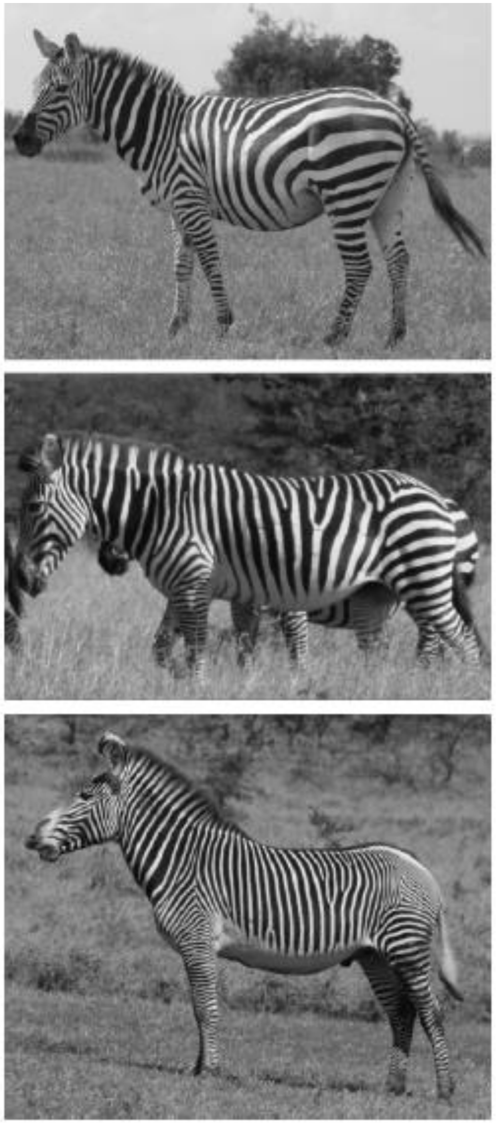


Figure 3 Comparative pictures of the side view of a plains zebra *Equus burchelli* (top), a hybrid (center) and a Grevy's zebra *Equus grevyi* (bottom). Hybrid stripes are less numerous than the Grevy's

Vlček *etiopský* (*Canis simensis* nebo *Simenia simensis*)

Vlček *etiopský* (*Canis simensis* nebo *Simenia simensis*)

Kde by se vzal v Africe vlk …? Vlk (*Canis lupus*) obývá přece Severní Ameriku, Evropu a Asii. Výjimka však přece potvrzuje pravidlo, a tak i na africkém kontinentu najdeme vlčího bratrance. Je jím patrně nejvzácnější šelma psovitá – vlček etiopský (Canis simensis).

Josef Vágner: „Vřesoviště bývají plná krysích děr a krysy slouží za potravu všem šelmám, které tam žijí. Nejzajímavějším lovcem krys je v Simienu vlček etiopský. Je to podivné, málo známé zvíře, které se poněkud podobá malému vlku, je však červený a má černý, bíle zakončený ohon. Nevyje jako vlk, nýbrž štěká jako liška.“

Vlček etiopský se na náhorních plošinách a v horách Etiopie objevil přibližně před sto tisíci lety v době ledové. Vrcholy hor a náhorní plošiny tehdy pokrývaly ledovce. Tehdy sem pronikly z Euroasie smečky psovitých šelem, které vzhledem i chováním připomínaly vlky a staly se prapředky vlčků etiopských.

Historický areál výskytu vlčků etiopských nikdy nebyl velký. A proto vždy byli vzácným a izolovaným druhem. Po roce 2000 se (především v údolí Web) pod náhorní plošinou Sanetti rozšířila mezi vlčky etiopskými epidemie vztekliny, kterou sem zavlekli domácí psi. Mezi vlčky, kteří žijí společenským smečkovým životem, se rychle šířila.

evropský sociální fond v ČR
EVROPSKÁ UNIE
MINISTERSTVO ŠKOLSTVÍ, MLÁDEŽE A TĚLOVÝCHOVY
OP Vzdělávání pro konkurenceschopnost
INVESTICE DO ROZVOJE VZDĚLÁVÁNÍ

ETHIOPIAN WOLF CONSERVATION PROGRAMME

THE PROGRAMME | ETHIOPIAN WOLVES | AFROALPINE HIGHLANDS | THE PEOPLE | HOW YOU CAN HELP

EWCP

News
Publications
Contact Us

Sept 2013 - Read the latest Jeedala Gazette on our community education page.

Sept 2013 - Support the EWCP by buying our new range of t-shirts. See details.

June 2013 - Read the 2013 Annual report. pdf 907kb

June 2012 - Read the Habitat Change annual report. pdf 3.2mb

February 2012 - Read the new Strategic Plan. pdf 2.9mb

These elegant, long-legged wolves are only found in a handful of scattered mountains in Ethiopia. Some 500 survive today in small populations, threatened by loss of highland habitats, disease and persecution.

Informed by sound research, the **Ethiopian Wolf Conservation Programme** targets the greatest threats to the survival of Ethiopian wolves and their Afroalpine habitat. We promote this charismatic species as a flagship, so protecting many of Ethiopia's endemic species and natural resources.

The official EWCP website. All about Ethiopian wolf biology and conservation

Join an exclusive 10-day trip with Claudio Sillero and the EWCP team watching Ethiopian wolves in The Bale Mountains.

Click for more details.

BORN FREE | WILDCRU | Canid Specialist Group | EWCA

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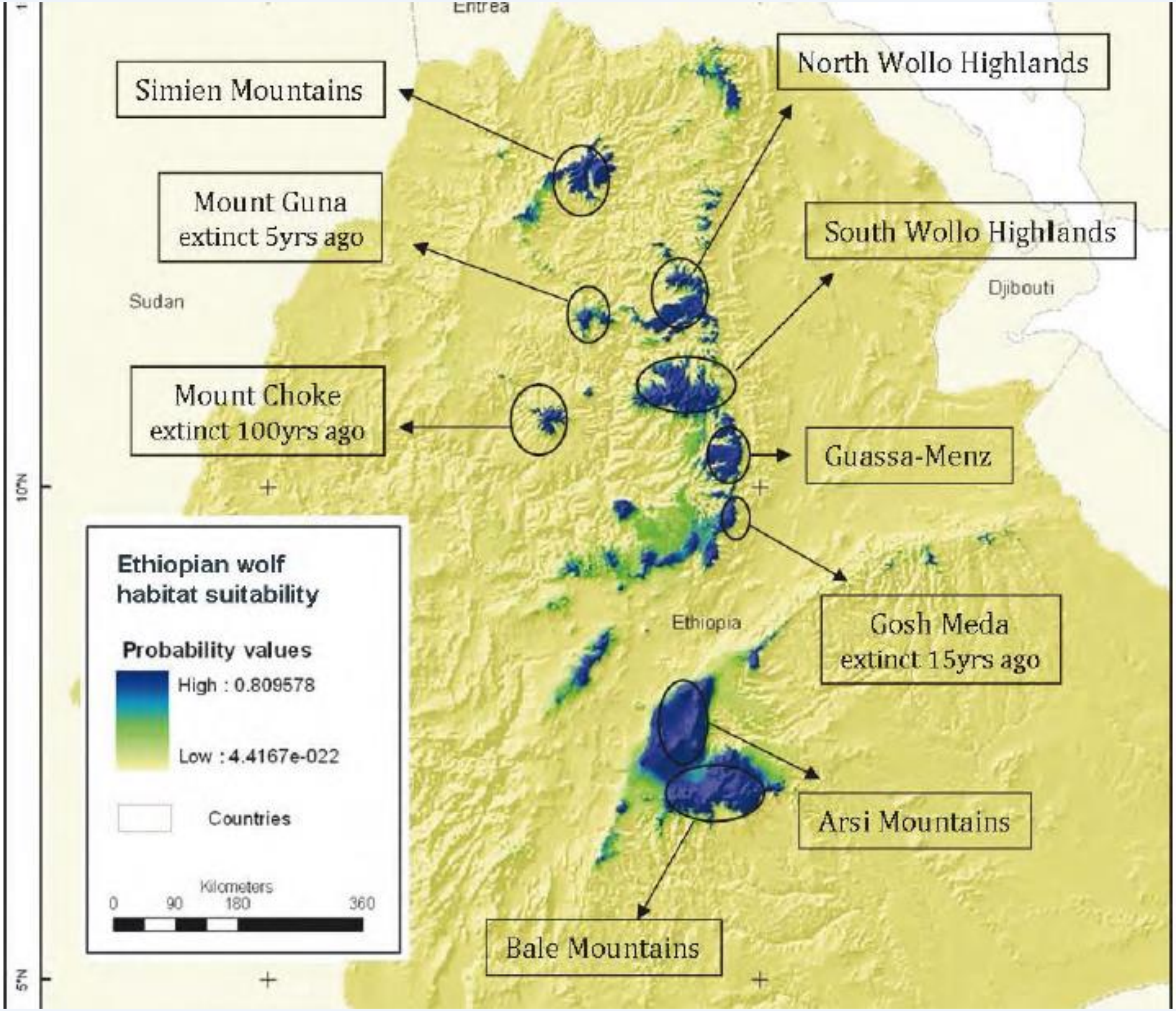
OP Vzdělávání pro konkurenceschopnost

INVESTICE DO ROZVOJE VZDĚLÁVÁNÍ

Afroalpine range	Suitable habitat (km^2)	Population estimate (wolves >1 year old)	Population status	Suitable habitat within protected areas
Simien Mountains	273	52-75 (2006) (pack observations)	stable?	200 km^2 Simien Mountains NP
Mt Guna	~20	4 (2004); 0 (2011) (pack observations)	extinct ~5 years ago	-
Mt Choke	134	-	extinct ~100 years ago	-
North Wollo	140	19-23 (2000) (habitat-based estimate)	stable?	-
South Wollo	243	16-19 (2000) (habitat-based estimate)	stable?	~20km^2 Borena Saiynt Regional Park
Guassa-Menz	112	23 (2009) (pack observations)	declined recently due to disease (~40%)	82 km^2 Guassa Community Conservation Area
Gosh Meda	20	-	extinct ~15 years ago	-
Arsi Mountains	870	54 (2009) (pack observations)	stable?	870 km^2 Arsi Mountains Regional Park
Bale Mountains	1,141	~250 (2010) (pack observations)	declining due to disease	1,100 km^2 Bale Mountains NP
Overall	**2,984 km^2**	**400 - 450**	**Declining**	**2,270 km^2**


Eritrea
Simien Mountains
North Wollo Highlands
Mount Guna
extinct 5yrs ago
South Wollo Highlands
Sudan
Djibouti
Mount Choke
extinct 100yrs ago
Guassa-Menz
10°N
Ethiopian wolf
habitat suitability
Probability values
High : 0.809578
Low : 4.4167e-022
Countries
Kilometers
0 90 180 360
Ethiopia
Gosh Meda
extinct 15yrs ago
Arsi Mountains
Bale Mountains
5°N

Faktory ohrožující existenci vlčka etiopského:

- Fragmentace životního prostředí
- Malá populace
- Choroby (vzteklina a jiné virové choroby přenesené ze psa)
- Hybridizace se zdivočelými psy domácími

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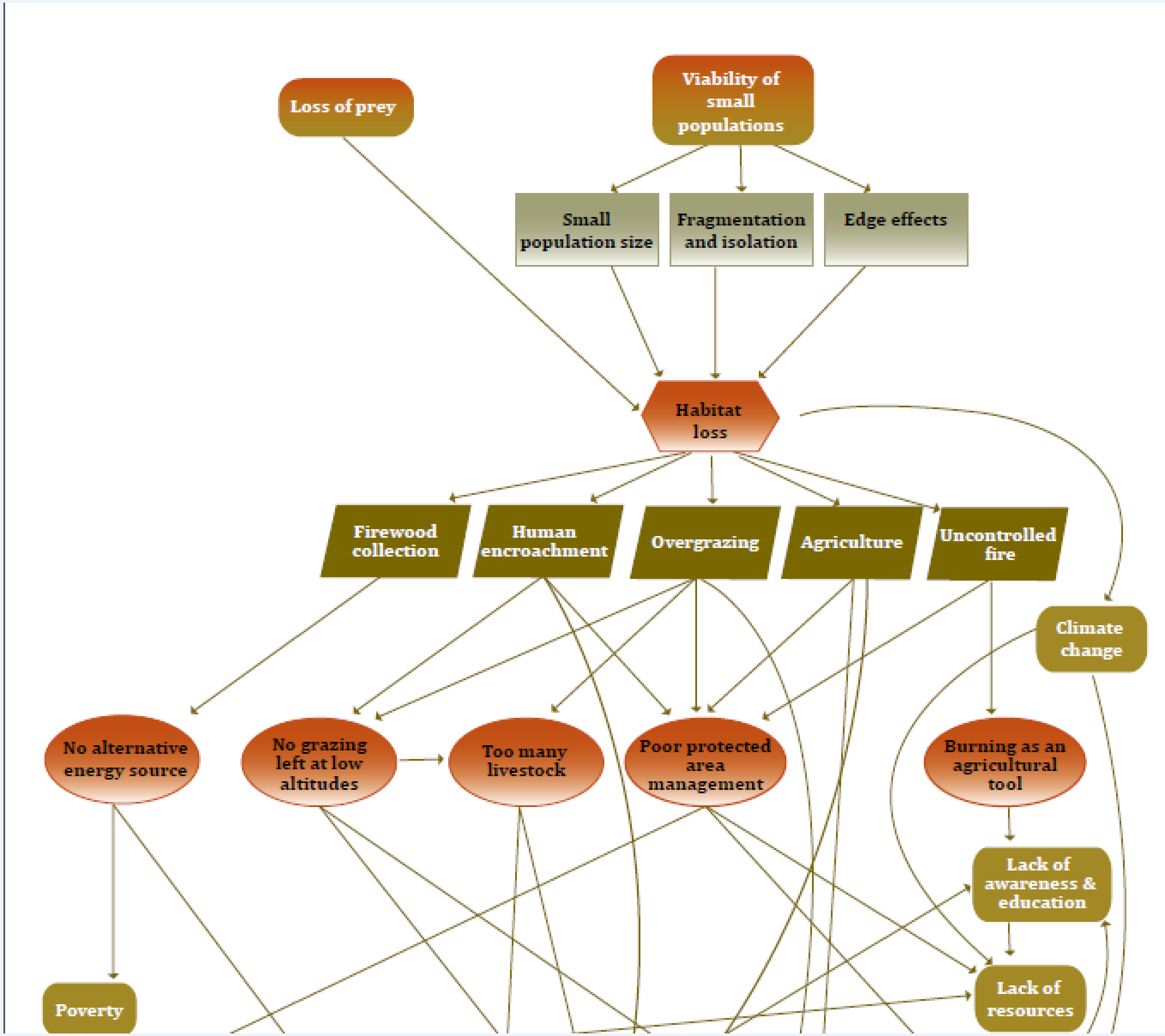
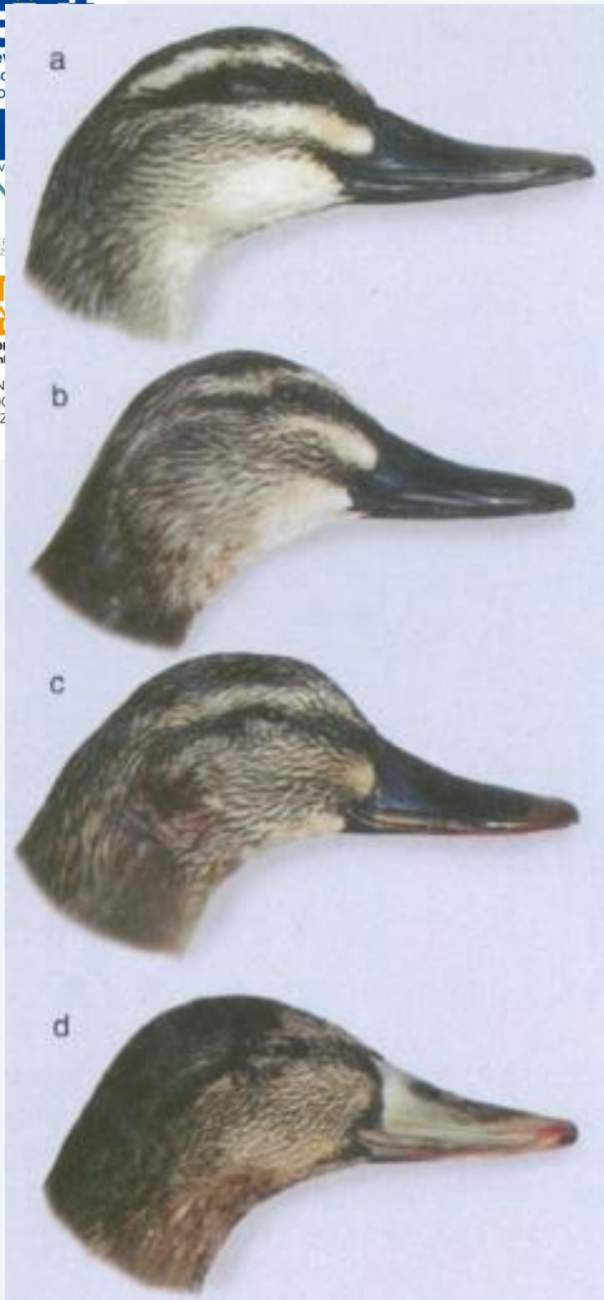
INVESTICE DO ROZVOJE VZDĚLÁVÁNÍ


Loss of prey
Viability of small populations
Small population size
Fragmentation and isolation
Edge effects
Habitat loss
Firewood collection
Human encroachment
Overgrazing
Agriculture
Uncontrolled fire
Climate change
No alternative energy source
No grazing left at low altitudes
Too many livestock
Poor protected area management
Burning as an agricultural tool
Lack of awareness & education
Lack of resources
Poverty



Evropský druh (*Anas platyrhynchus*)

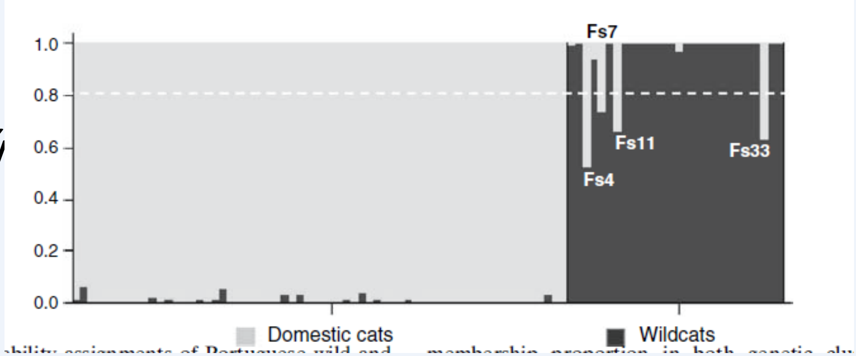
Hybridi

Novozélandský druh (*Anas superciliosa*)

Kočka divoká (*Felis silvestris*)

Kočka divoká evropská (*Felis silvestris silvestris*) se může křížit se zdivočelou kočkou domácí (*Felis s. catus*).

Hybridizace byla popsána v celém areálu výskytu kočky divoké s vysoký podílem kříženců v populacích v Maďarsku a Skotsku.



Wildcats are **most threatened by domestic cats. Hybridization is widespread**; there may be very few genetically pure populations of Wildcats remaining (Nowell and Jackson 1996, Macdonald *et al.* 2004, Phelan and Sliwa 2006, Driscoll *et al.* 2007). Of all Wildcat subspecies analyzed, only the Chinese Alpine Steppe Cat, *F. s. bieti,* showed no evidence of genetic introgression of domestic cat genes, but the sample size was small (Driscoll *et al.* 2007). Feral cats compete with Wildcats for prey and space, and there is also a high potential for disease transmission between domestic cats and Wildcats (Nowell and Jackson 1996, Daniels *et al.* 1999, Macdonald *et al.* 2004).

http://www.iucnredlist.org/details/8543/0

Cercocarpus traskiae
Santa Catalina Island mountain-mahogany and Catalina mahogany

It is endemic to the Channel Islands of California in the United States, where it is known from just a single population.
It was rare when it was first discovered in 1897 when about 40 plants were counted. When it was federally listed as an endangered species in 1996 there were only six mature plants remaining.

Ohroženo

- **vlivem pastvy**
- **Hybridizací s *Cercocarpus betuloides***

Platanus racemosa

Údolí řeky Sacramento v Kalifornii, USA

Hybridizace se zavlečeným druhem

Platanus orientalis (Evropa-Asie) x P.occidentalis (Severní Amerika)

Lantana depresa

Endemický druh z Floridy

Asijský druh (Lantana camara)

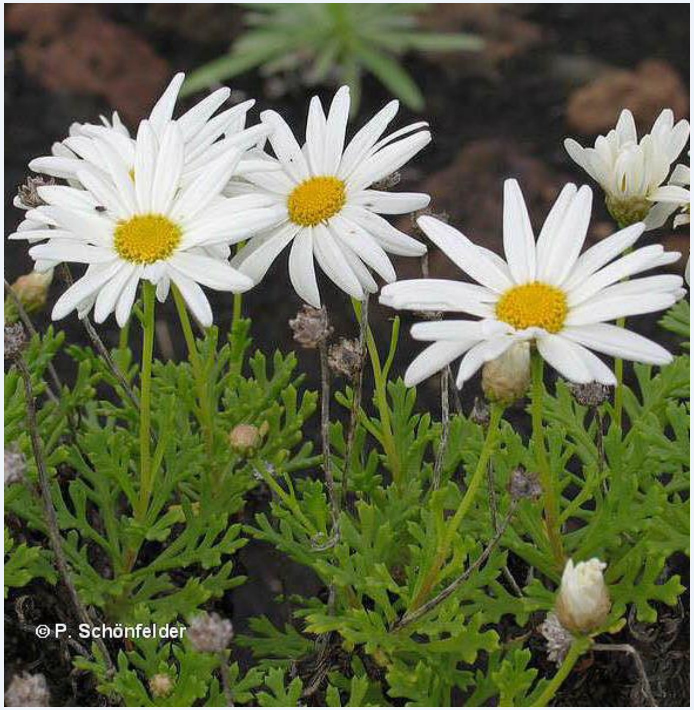
Argyranthemum coronopifolium

Endemitický druh na Tenerife
Nacházející se na pouze 7 lokalitách

Hybridizace s rozšířenějším, invazivním druhem *A. frutescens*

Od roku 1965 kdy byla postavena silnice procházející napříč ostrovem

V roce 1985 zaznameními již jen dominantní hybridi a *A. frutescens*

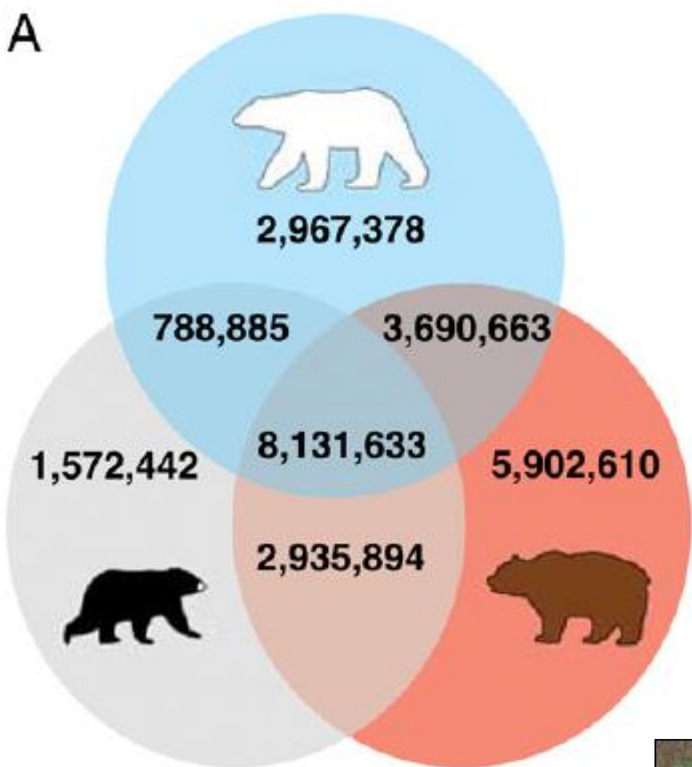


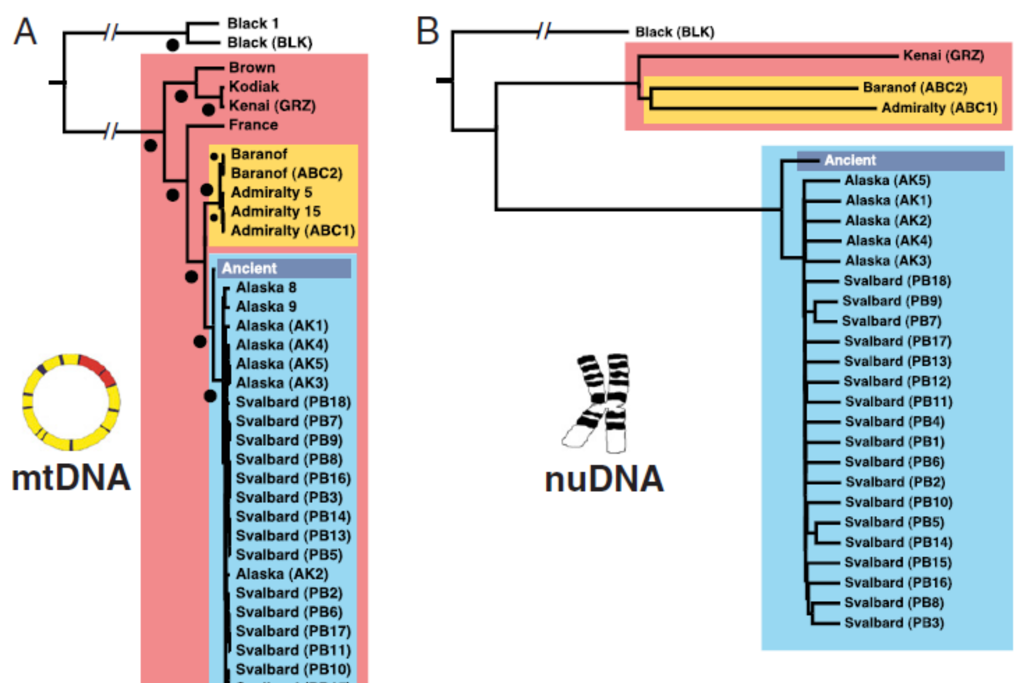
The polar bear (possible hybrid pictured) is one of several species vulnerable to hybridization.

The Arctic melting pot

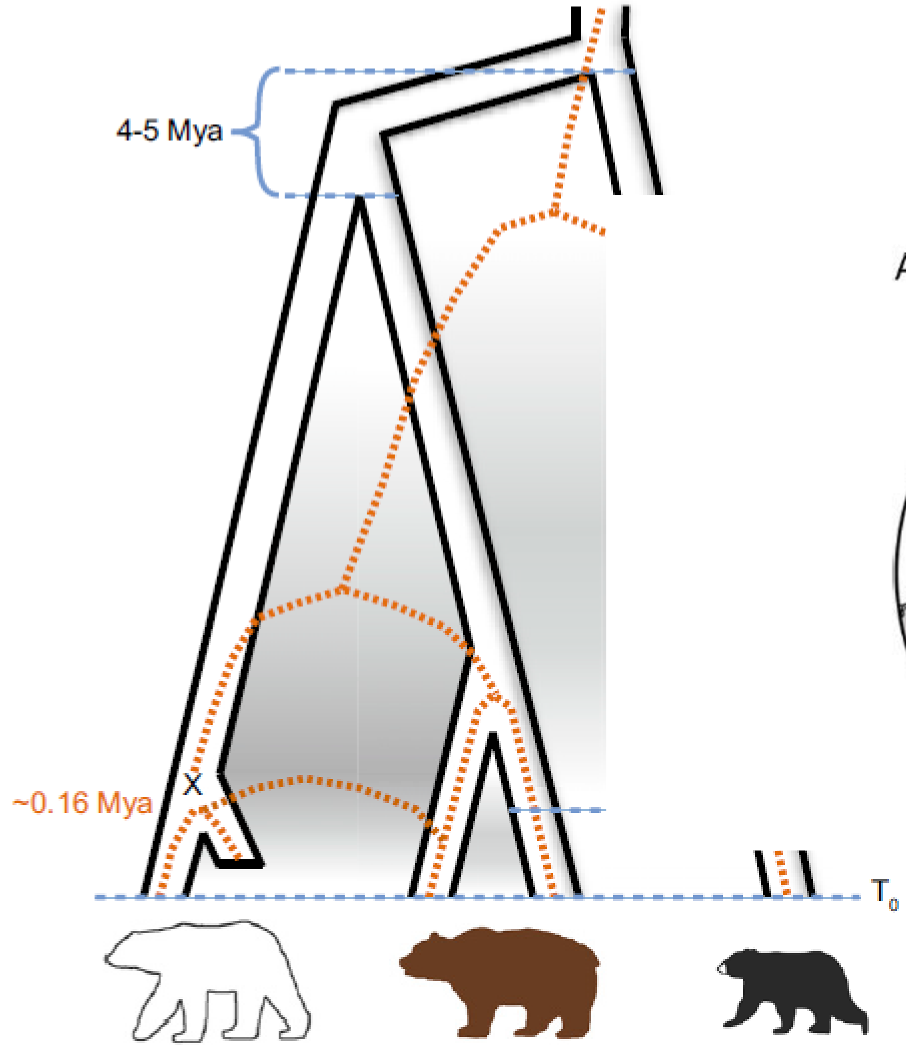
Hybridization in polar species could hit biodiversity hard,

As Arctic Melts, Polar and Grizzly Bears Mate





www.pnas.org/cgi/doi/10.1073/pnas.1210506109



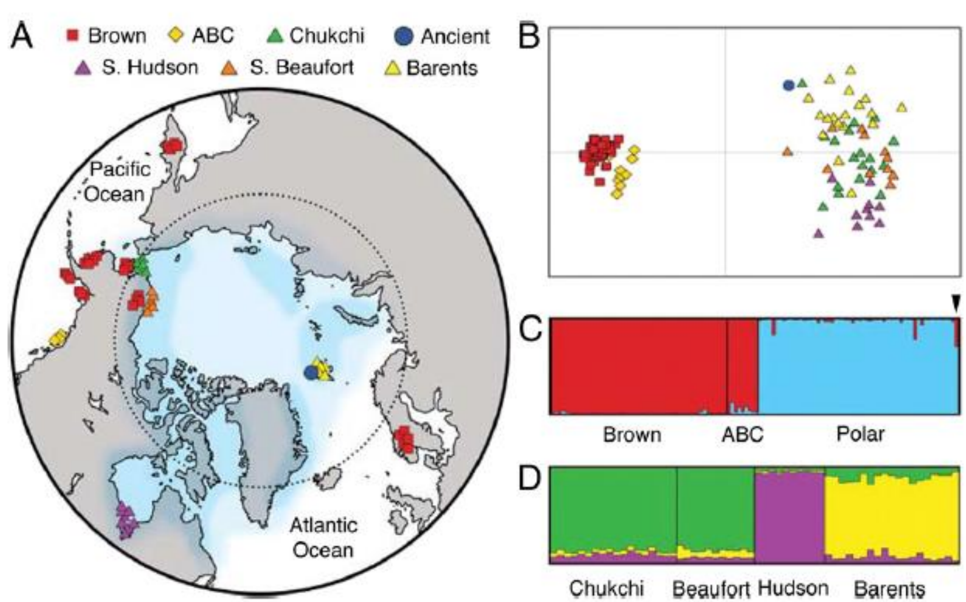


Fig. 3. Phylogenetic discordance and divergence among bears. A schematic species tree (black outline) highlights the discordance between mtDNA and nuclear histories, with the dashed orange line representing the mtDNA gene tree. The figure illustrates introgression and replacement (marked with an X) of PB mitochondrial DNA with an ABC brown bear mitochondrial genome,

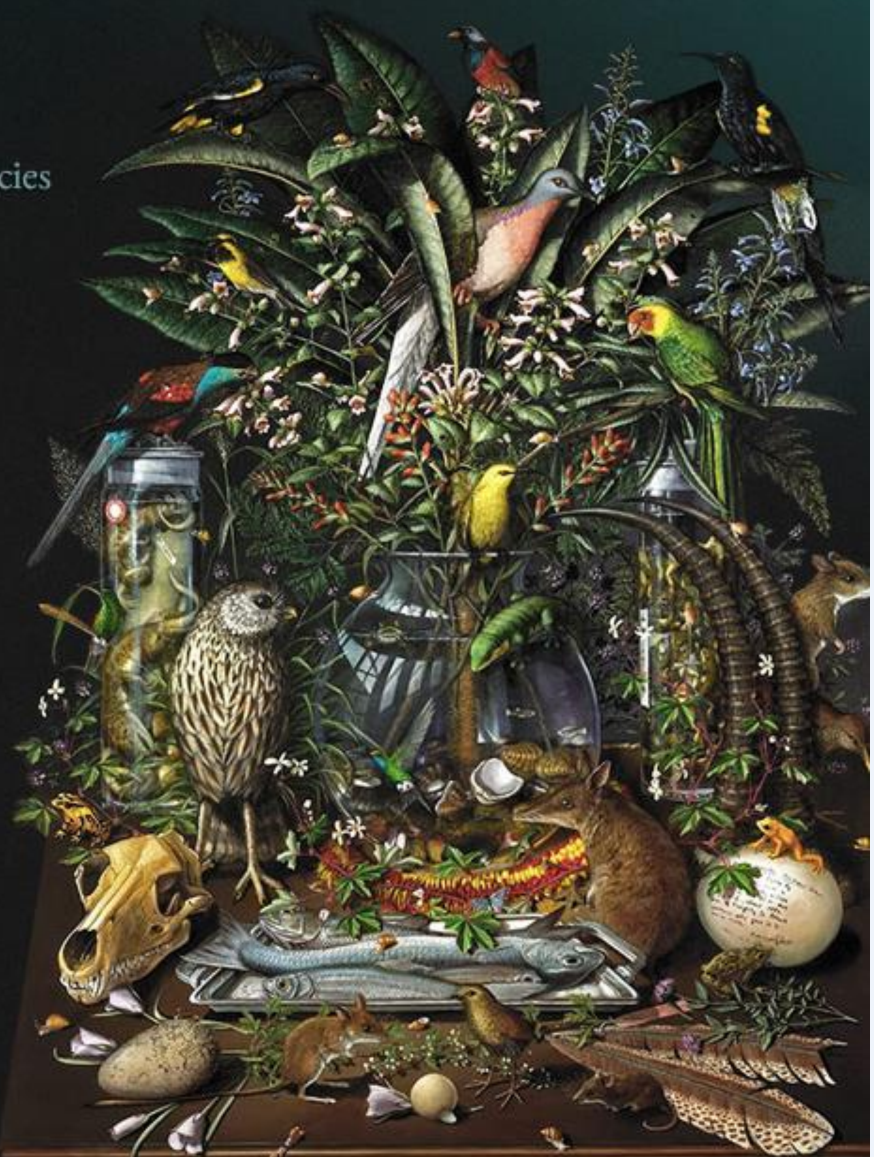
revive & restore

genetic rescue of endangered and extinct species

Thanks to the rapid advance of genomic technology, new tools are emerging for conservation. Endangered species that have lost their crucial genetic diversity may be restored to reproductive health. Those threatened by invasive diseases may be able to acquire genetic disease-resistance.

It may even be possible to bring some extinct species back to life. The DNA of many extinct creatures is well preserved in museum specimens and some fossils. Their full genomes can now be read and analyzed. That data may be transferable as working genes into their closest living relatives, effectively bringing the extinct species back to life. The ultimate aim is to restore them to their former home in the wild.

Molecular biologists and conservation biologists all over the world are working on these techniques. The role of Revive & Restore is to help coordinate their efforts so that genomic conservation can move ahead with the best current science, plenty of public transparency, and the overall goal of enhancing biodiversity and ecological health worldwide.



"Gone"— Isabella Kirkland's painting of 63 species that have gone extinct since the 1700s.

The Great Passenger Pigeon Comeback

This is the first project to revive an extinct animal using its museum-specimen DNA. Once it succeeds, the techniques will be applicable to hundreds of other extinct species.

› Project goals
› Why passenger pigeons?
› Progress to date
› UC Santa Cruz Paleogenomics Lab partnership
› History of the passenger pigeon
› Population ecology

Project goals

The goal of The Great Passenger Pigeon Comeback is to bring the passenger pigeon all the way back using the genome of the band-tailed pigeon and state-of-the-art genomic technology.

Female passenger pigeon. Painting by Tim Hough.

The genomes of the two birds will be compared in close detail, to determine which differences are most crucial. The data and analysis will be completed by George Church's lab at Harvard's Wyss Institute, beginning with the process of converting viable band-tailed DNA into viable

Work in Progress

DNA Sequencing starts on "Passenger Pigeon 1871"
by Ben Novak
October 18, 2013

On October 8th, 2013, Ryan Phelan, Stewart Brand, and I were graciously allowed to view a historic moment at Genentech Hall of the University of California San Francisco's Mission Bay campus. We were in the sequencing facility courtesy of Eric Chow, Jo Derisi, and Jessica Lund, who manage the sequencing facility and conduct fascinating research in the lab.

Our passenger pigeon DNA is in their hands now, as our genome candidate "Passenger Pigeon 1871", aka ROM 34.3.23.2, aka BN1-1, begins extensive DNA sequencing. (The "1871" is for the year that the specimen was shot and then preserved.)

The lab is awesome: machines upon machines for all manner of scientific work. 3-D printers are busy creating custom parts for specialized microscopes. Robots for DNA extraction stand ready for a task alongside incubators and refrigerators and devices that look like they are made of dozens of microtubes carrying reagents for all kinds of enzymatic reactions. And of course there are the big guns— the DNA sequencing machines.

Passenger Pigeon 1871 was selected as the candidate for the full genome sequence for its superb quality compared to other passenger pigeon specimens. Over the last two years Dr. Shapiro, myself and colleagues have scrutinized the quality of 77 specimens including bones and tissues. Our first glimpses of data confirmed that the samples would be able to provide the DNA needed for a full genome