

Data Visualization in R with **ggplot2**

Group Project "Plant Extinctions"

Cédric Scherer

Physalia Courses | November 9-13 2020

Photo by Richard Strozyński

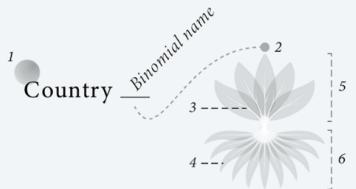
EXAMPLE



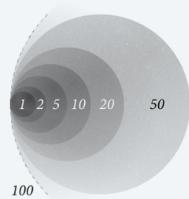
Name	<i>Eragrostis fosbergii</i>
Group	Flowering Plant
Country	United States
Red List Category	Extinct
Year Last Seen	1996
Threats	Invasive Species Climate Change Natural Systems Modifications
Current Actions	Land & Water Protection Research & Monitoring

LEGEND

Species



1. Extinct per Country



2. Group

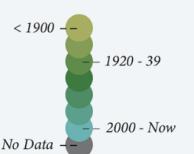
- ▲ Alga
- ▼ Conifer
- ◆ Cycad
- Fern
- Flowering Plant
- ★ Moss

3. Red List Category



Extinct
in the Wild

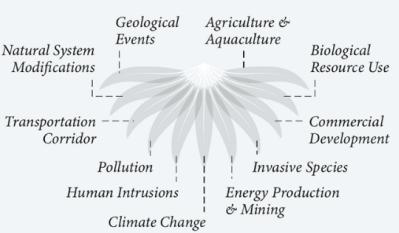
4. Year Last Seen (Color)



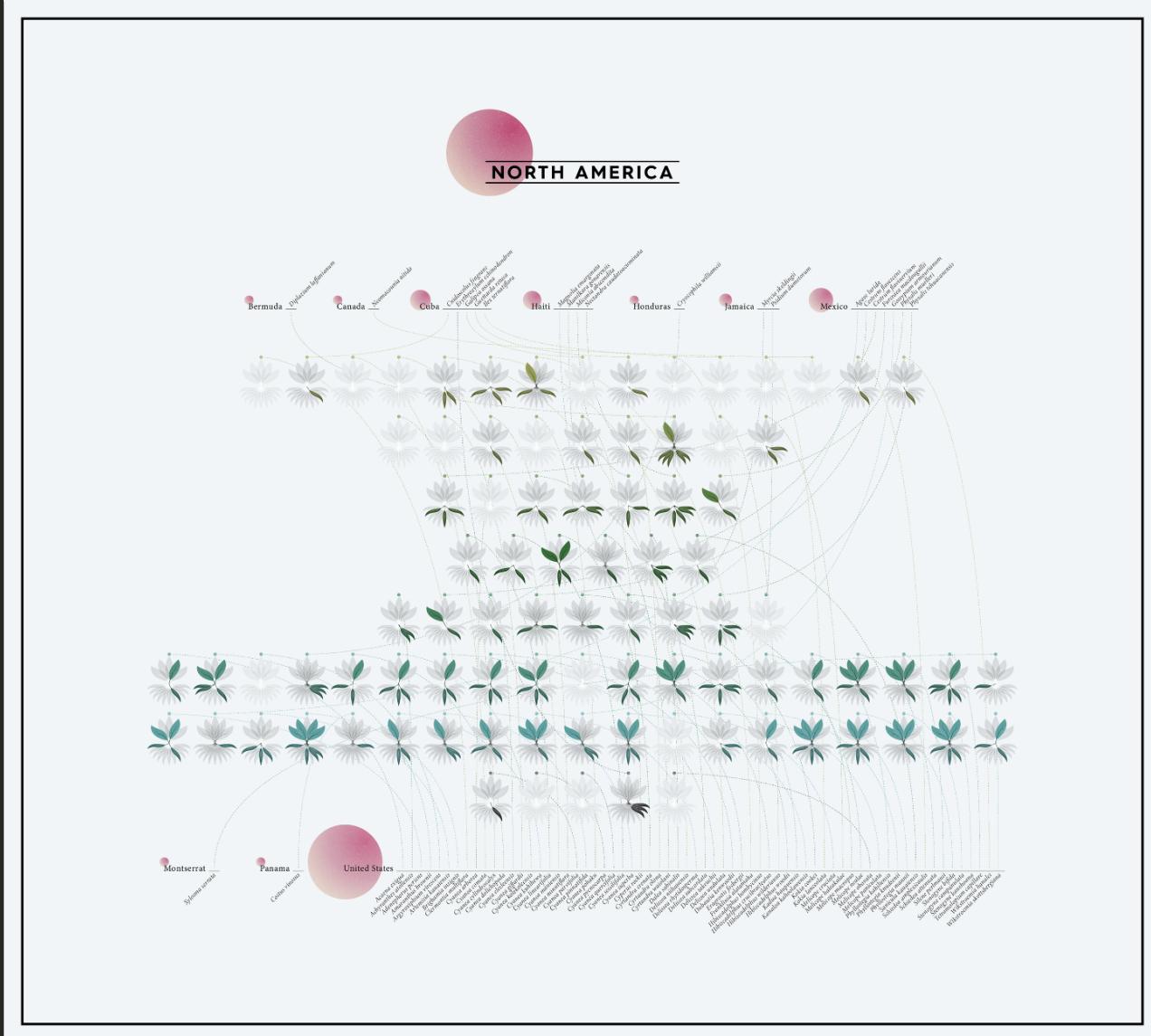
5. Current Actions



6. Threats



Visualization by Florent Lavergne



Visualization by Florent Lavergne

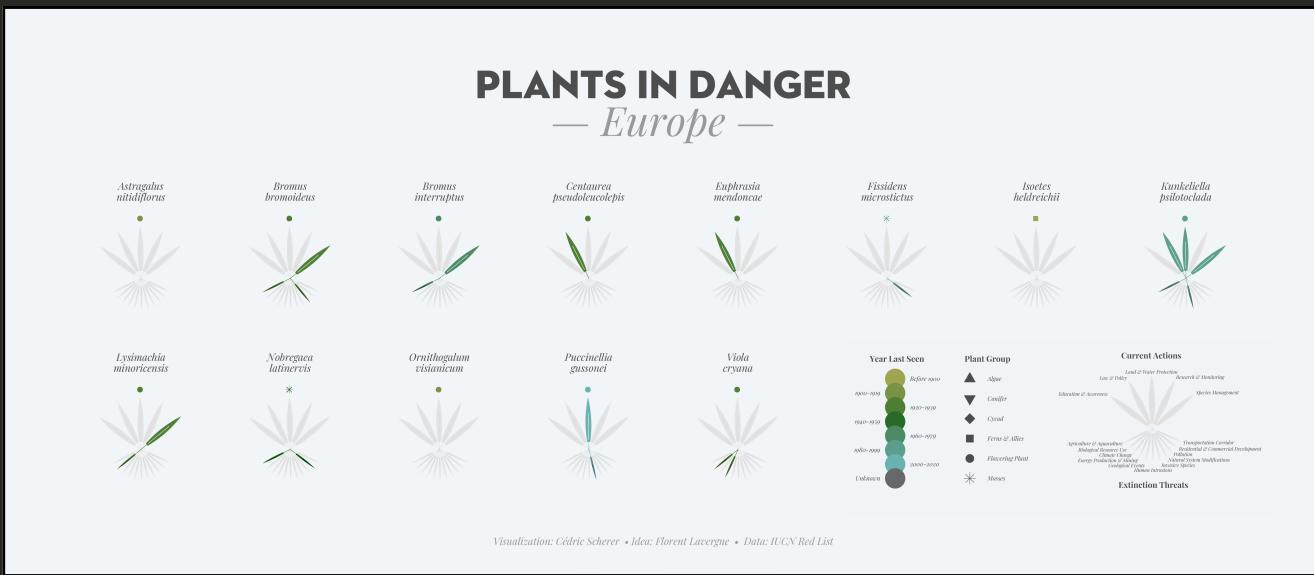
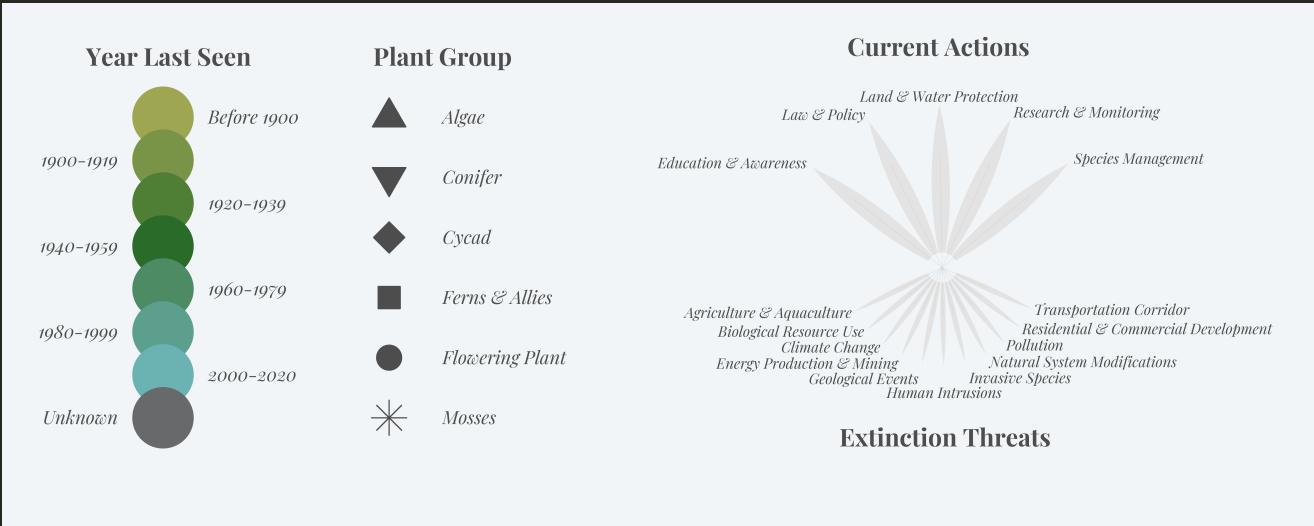
PLANTS IN DANGER

— North America —



Visualization: Cédric Scherer • Idea: Florent Lavergne • Data: IUCN Red List

Visualization by Cédric Scherer



Visualization by Cédric Scherer

Your Turn!

- Import and explore the IUCN red list data on plant extinctions.

`github.com/rfordatascience/tidytuesday/blob/master/data/2020/2020-08-18/readme.md`

- Make one or more explorative plots to investigate interesting patterns.

- If needed, prepare the data by using functions from our "Data Wrangling" session.

`mutate()`, `summarize()`, `group_by()`, `pivot_longer()`, `case_when()`

- Decide for your main story and chart type and create a polished plot that transports your story.

Try to include as many things you've learned about ggplot, e.g. change scales and theme elements.

Import the Data

Full data set

```
plants <- read_csv('https://raw.githubusercontent.com/rfordatascience/tidytuesday/master/plants.csv')
```

Data on current actions (already in long format)

```
actions <- read_csv('https://raw.githubusercontent.com/rfordatascience/tidytuesday/master/actions.csv')
```

Data on extinction threats (already in long format)

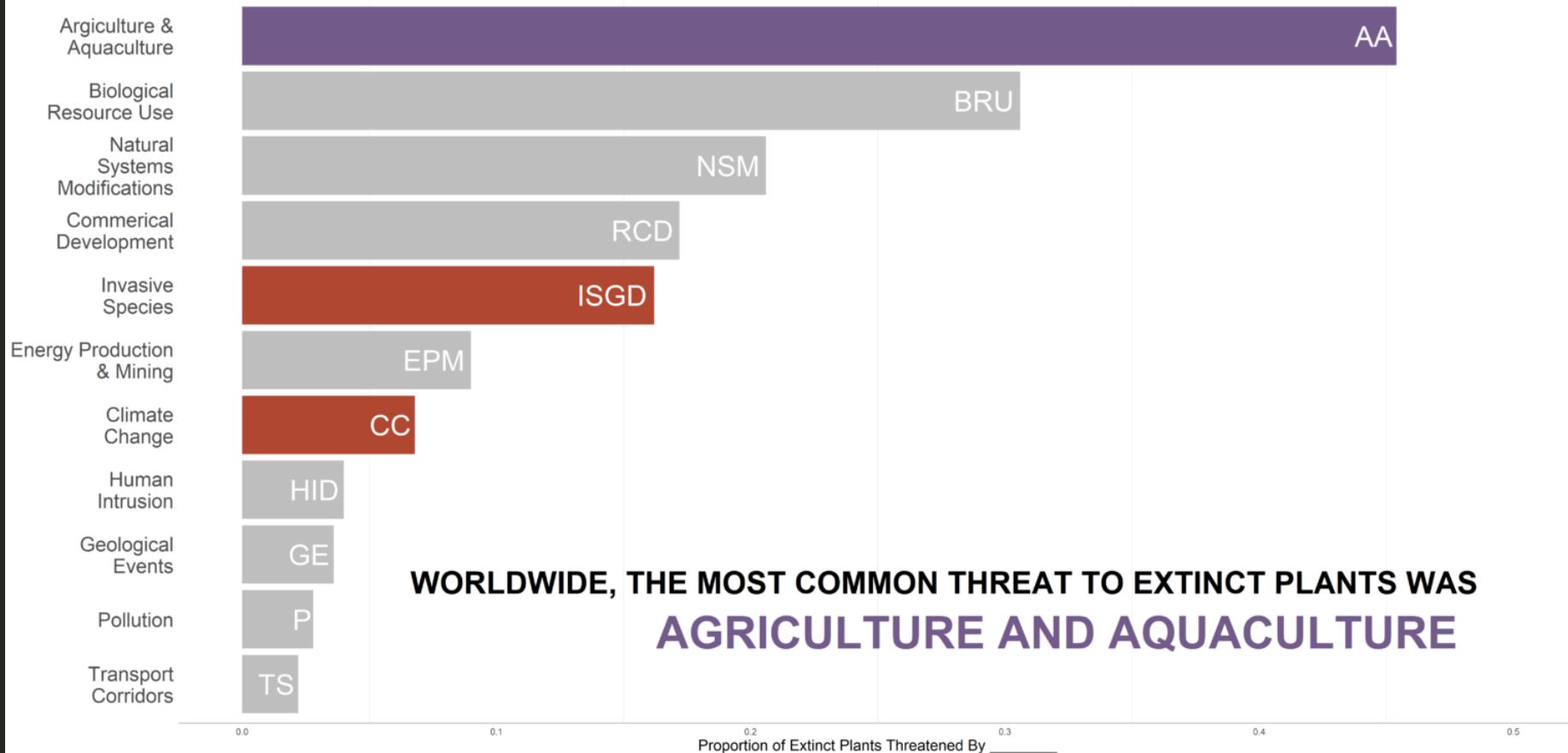
```
threats <- read_csv('https://raw.githubusercontent.com/rfordatascience/tidytuesday/master/threats.csv')
```

```
tibble::glimpse(plants)
## Rows: 500
## Columns: 24
## $ binomial_name      <chr> "Abutilon pitcairnense", "Acaena exigua", "Acalyp...
## $ country             <chr> "Pitcairn", "United States", "Congo", "Saint Hele...
## $ continent            <chr> "Oceania", "North America", "Africa", "Africa", ...
## $ group                <chr> "Flowering Plant", "Flowering Plant", "Flowering ...
## $ year_last_seen       <chr> "2000-2020", "1980-1999", "1940-1959", "Before 19...
## $ threat_AA            <dbl> 0, 0, 0, 1, 1, 0, 0, 0, 1, 0, 0, 1, 1, 0, 0, 0...
## $ threat_BRU           <dbl> 0, 0, 0, 1, 0, 0, 0, 0, 1, 1, 1, 1, 0, 1, 0, 0...
## $ threat_RCD           <dbl> 0, 0, 0, 0, 1, 1, 1, 0, 0, 1, 0, 0, 1, 0, 0, 0...
## $ threat_ISGD          <dbl> 1, 1, 0, 1, 1, 0, 1, 1, 0, 0, 0, 0, 0, 0, 0, 0...
## $ threat_EPM            <dbl> 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0...
## $ threat_CC             <dbl> 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0...
## $ threat_HID            <dbl> 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0...
## $ threat_P              <dbl> 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0...
## $ threat_TS             <dbl> 0, 0, 0, 0, 1, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0...
## $ threat_NSIM           <dbl> 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0...
## $ threat_GE              <dbl> 1, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0...
## $ threat_NA             <dbl> 0, 0, 0, 1, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 1...
## $ action_LWP            <dbl> 1, 0, 0, 0, 0, 0, 0, 1, 0, 0, 1, 0, 0, 0, 0, 0...
## $ action_SM             <dbl> 1, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0...
## $ action_LP             <dbl> 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0...
## $ action_RM             <dbl> 1, 1, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0...
## $ action_EA             <dbl> 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0...
```

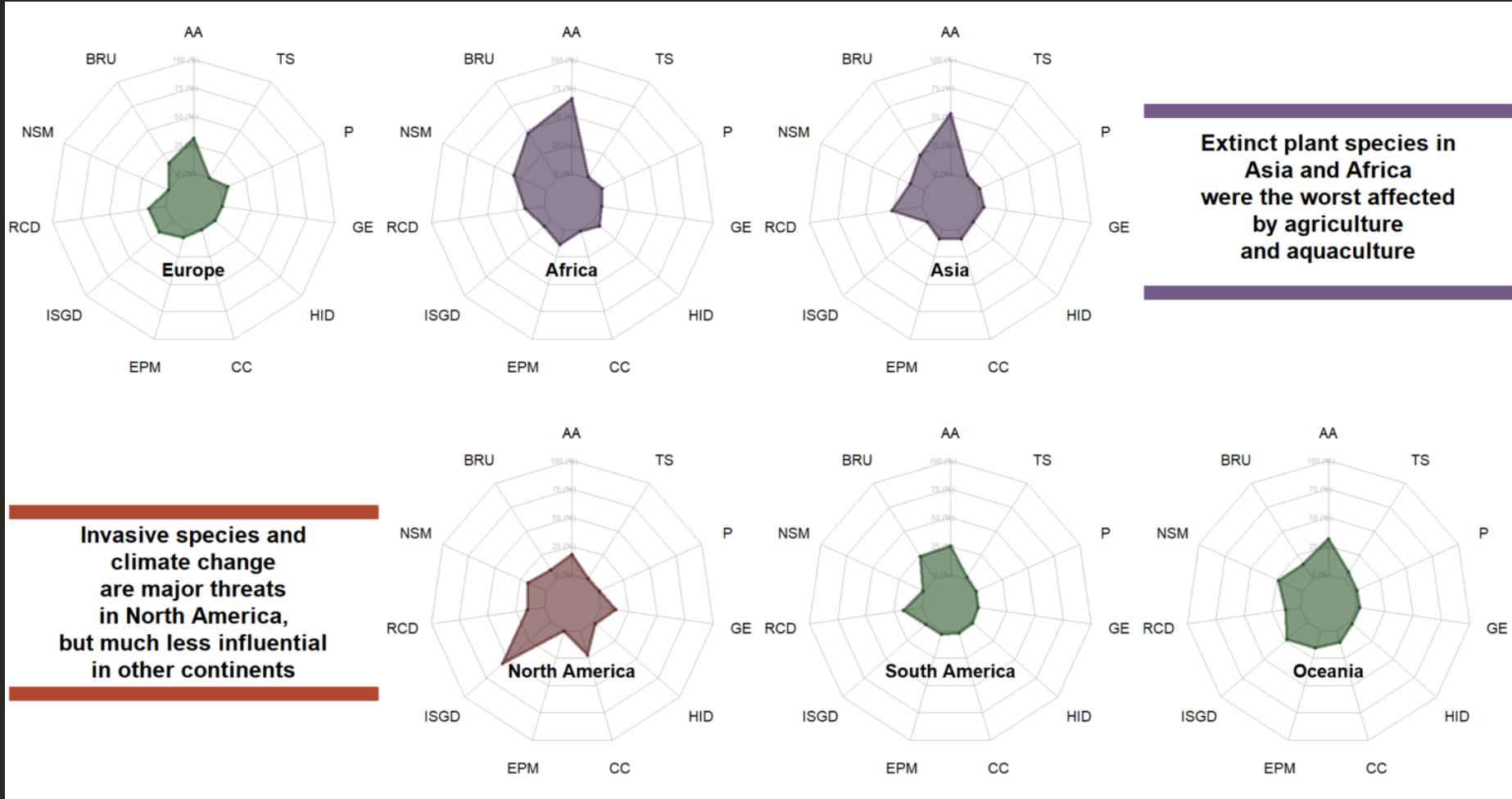
```
tibble::glimpse(actions)
## Rows: 3,000
## Columns: 8
## $ binomial_name      <chr> "Abutilon pitcairnense", "Abutilon pitcairnense", ...
## $ country             <chr> "Pitcairn", "Pitcairn", "Pitcairn", "Pitcairn", "...
## $ continent           <chr> "Oceania", "Oceania", "Oceania", "Oceania", "Ocea...
## $ group               <chr> "Flowering Plant", "Flowering Plant", "Flowering ...
## $ year_last_seen      <chr> "2000-2020", "2000-2020", "2000-2020", "2000-2020...
## $ red_list_category   <chr> "Extinct in the Wild", "Extinct in the Wild", "Ex...
## $ action_type          <chr> "Land & Water Protection", "Species Management", ...
## $ action_taken         <dbl> 1, 1, 0, 1, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0...
```

```
tibble::glimpse(threats)
## Rows: 6,000
## Columns: 8
## $ binomial_name      <chr> "Abutilon pitcairnense", "Abutilon pitcairnense", ...
## $ country             <chr> "Pitcairn", "Pitcairn", "Pitcairn", "Pitcairn", "...
## $ continent           <chr> "Oceania", "Oceania", "Oceania", "Oceania", "Ocea...
## $ group               <chr> "Flowering Plant", "Flowering Plant", "Flowering ...
## $ year_last_seen      <chr> "2000-2020", "2000-2020", "2000-2020", "2000-2020...
## $ red_list_category   <chr> "Extinct in the Wild", "Extinct in the Wild", "Ex...
## $ threat_type          <chr> "Agriculture & Aquaculture", "Biological Resource...
## $ threatened           <dbl> 0, 0, 0, 1, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 1, 0...
```

Extinction Threat Description		Current Action Description	
AA	Agriculture & Aquaculture	LWP	Land & Water Protection
BRU	Biological Resource Use	SM	Species Management
RCD	Commercial Development	LP	Law & Policy
ISGD	Invasive Species	RM	Research & Monitoring
EPM	Energy Production & Mining	EA	Education & Awareness
CC	Climate Change	NA	Current action unknown
HID	Human Intrusions		
P	Pollution		
TS	Transportation Corridor		
NSM	Natural System Modifications		
GE	Geological Events		
NA	Threat unknown		



Visualization by Eilidh Fumney

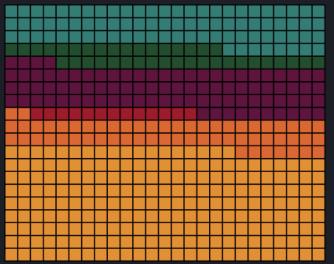


Visualization by Eilidh Fumney

Global Biodiversity Loss

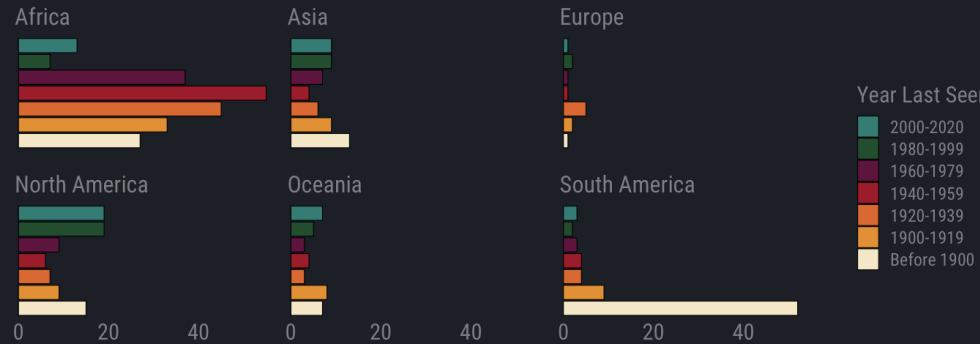
As of 2020, 500 plant species are considered extinct

Where?

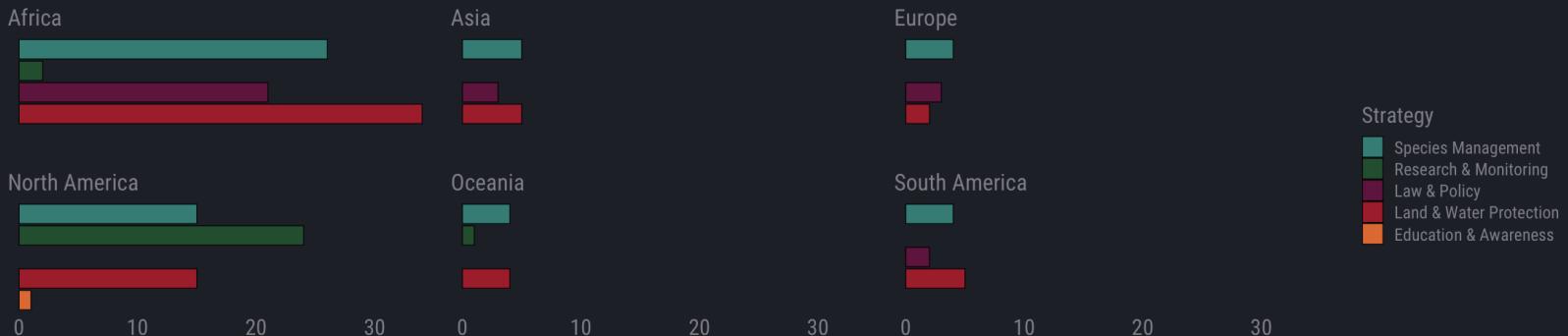


South America
Oceania
North America
Europe
Asia
Africa

When?



What is being done?



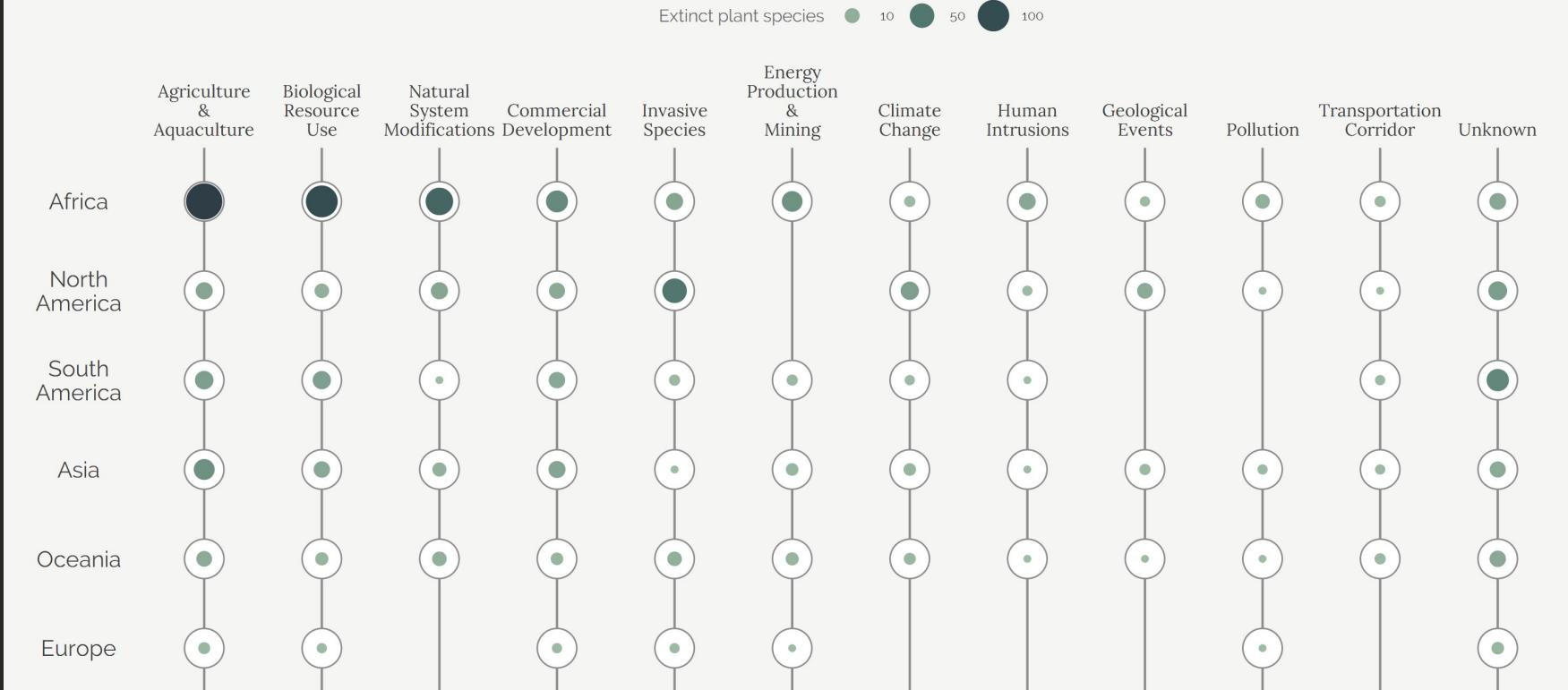
Created by @kllycttn, Data from International Union for Conservation of Nature, #TidyTuesday



Visualization by Kelly Cotton

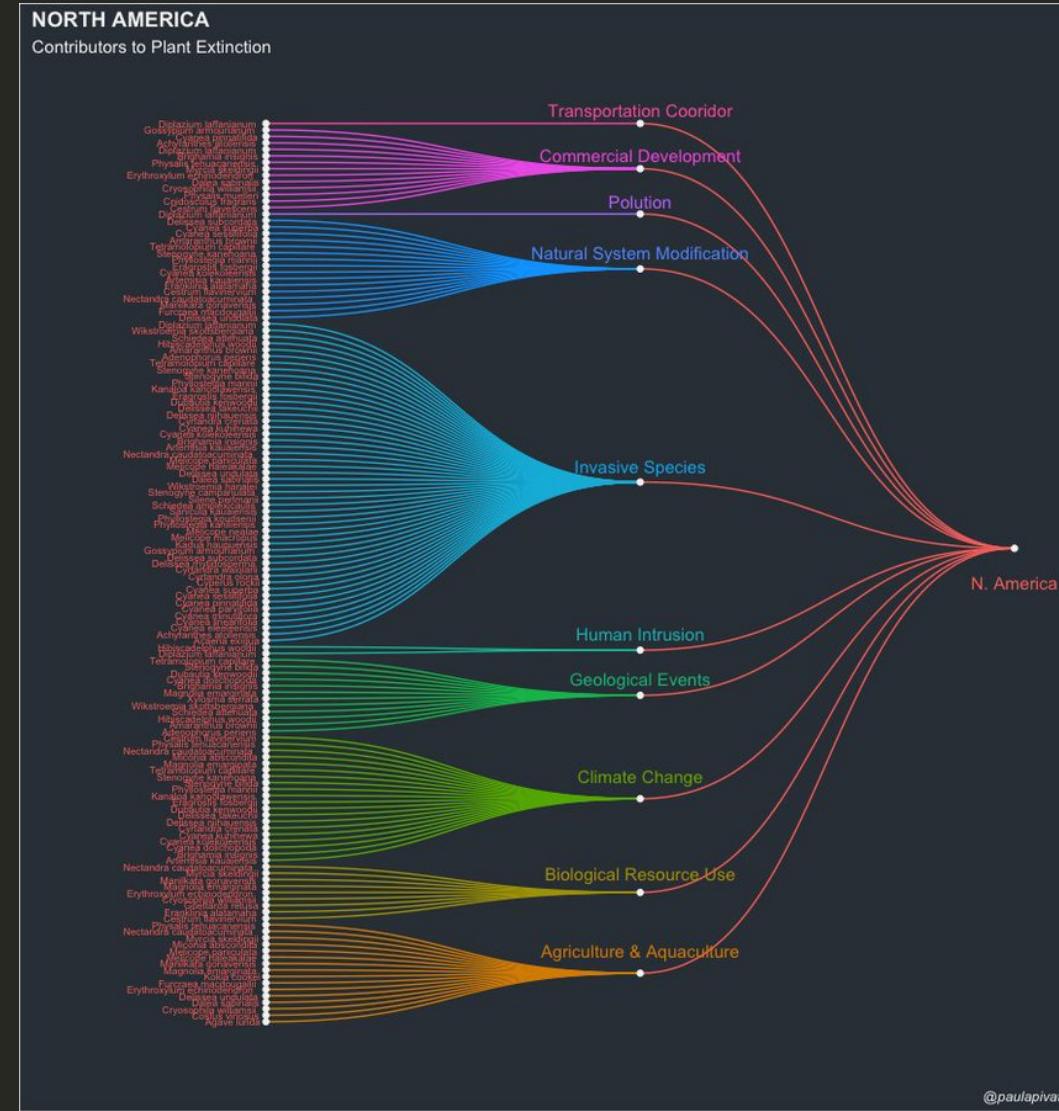
Threats to Global Plant Existences

As of 2020, five hundred plant species globally are considered extinct. 19.6% of those were endemic to Madagascar (Africa). Africa is faced with significant and mounting threats resulting from activities including logging, fuelwood collection, and deforestation for agriculture and mining. The ongoing negative effects on biodiversity are projected to be compounded further by climate change by the end of this century.



@MaiaPelletier | #TidyTuesday | Data: IUCN Red List of Threatened Species (Version 2020-1)

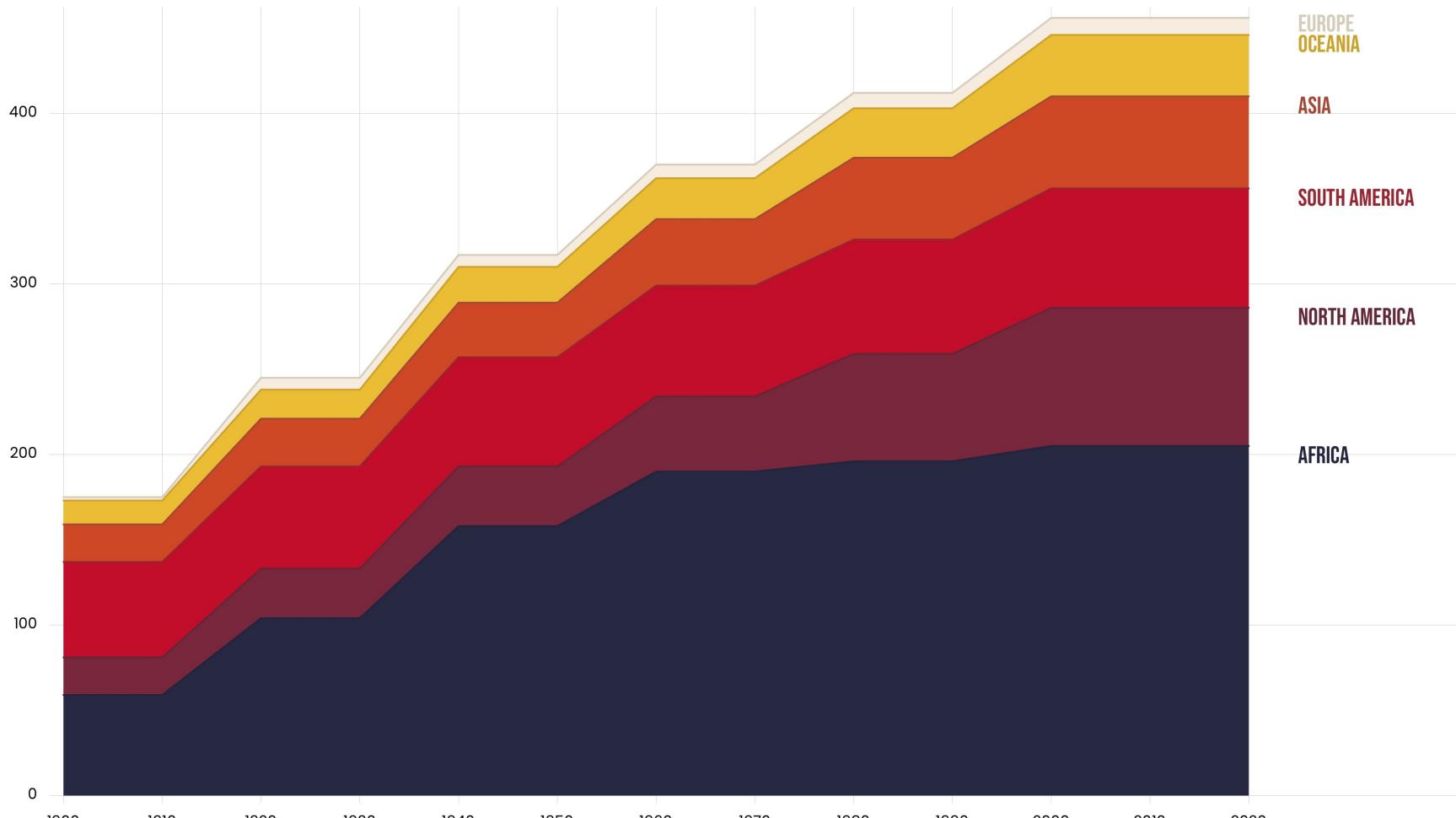
Visualization by Maia Pelletier



Visualization by Paul Apivat

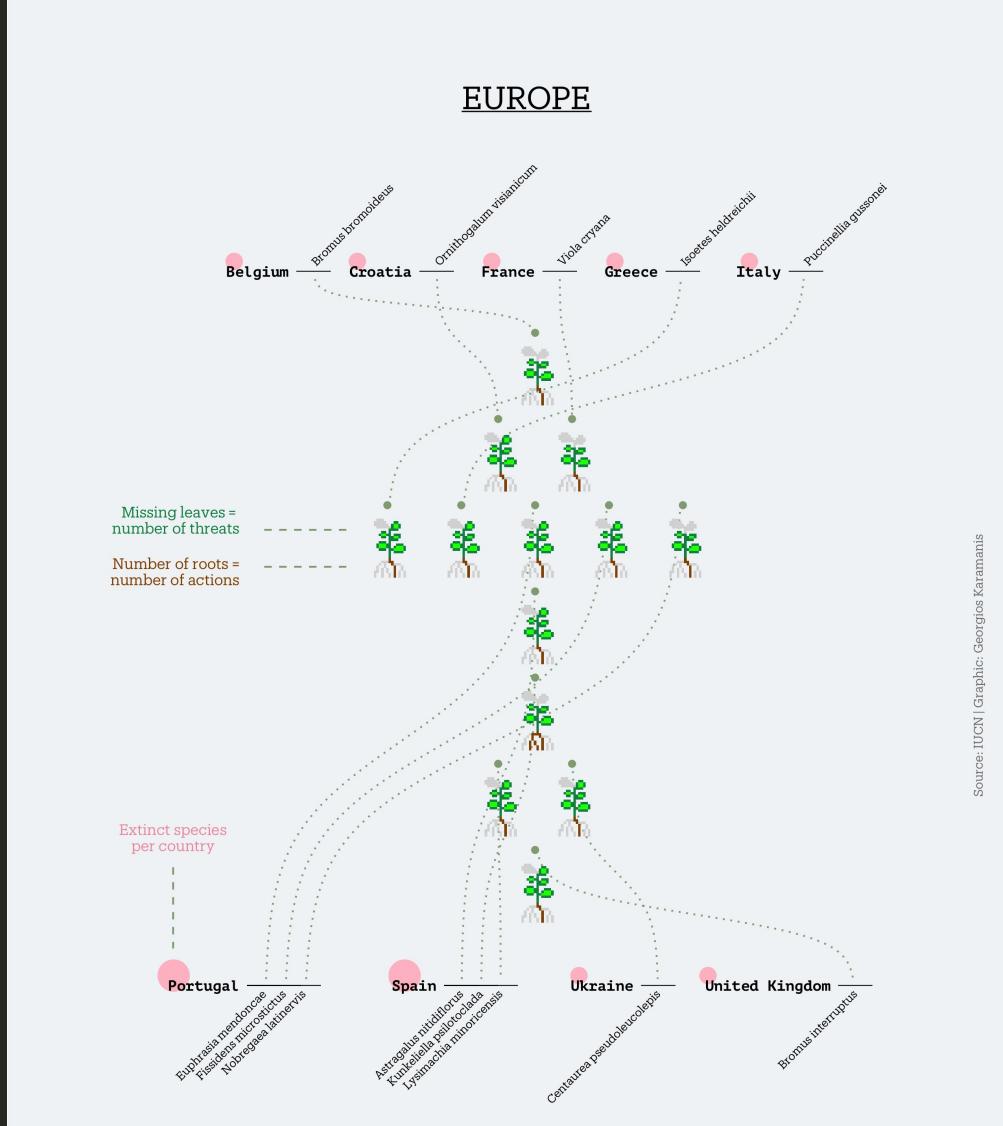
FLOWERING PLANT SPECIES LOST GLOBALLY FROM 1900-2020

Since 1900, flowering plants have been facing extinctions due to human activities. In total, 500 plant species are considered extinct as of 2020. 45% of those were endemic to **Africa** followed by **North** and **South America** with 17.8% and 15.4%, respectively.



Data: IUCN Red List | Graphic: @jakekaupp

Visualization by Jake Kaupp



Source: IUCN | Graphic: Georgios Karamanis

Visualization by Georgios Karamanis