# Incorporating OCR into a digitisation and curation workflow

Elspeth Haston, Robyn Drinkwater &
Robert Cubey

Royal
Botanic Garden
Edinburgh

# Royal Botanic Garden Edinburgh

- Living collections, Herbarium and Library & Archives
- Nearly 3 million herbarium specimens
- ⅔ million specimens databased
- ¼ million specimens imaged and online

# Context

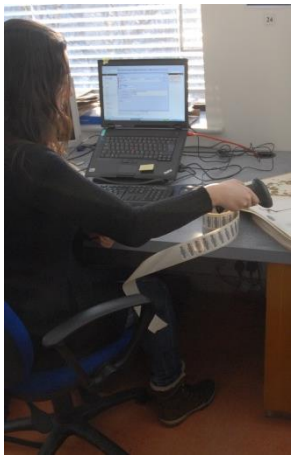
- Digitisation of herbaria: “gold standards” set by the Global Plants Initiative (600dpi + full data)
- Shift to large scale digitisation with resulting changes in process necessary

# Standard Workflow

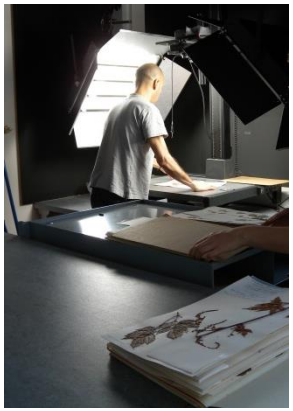
1. Minimal curation

2. Assign unique identifier
(eg attach barcode)

3. Initial minimal data capture



4. Image specimen
(camera or scanner)



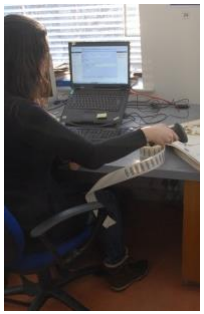
5. Additional data entry

# Expanded Workflow

1. Minimal curation

2. Assign unique identifier (eg attach barcode)

3. Initial minimal data capture



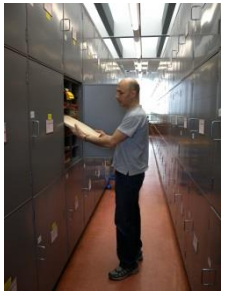
4. Image specimen (camera or scanner)

4a. Assess specimen condition

4b. OCR processing


5. Additional data entry

5a. Additional curation

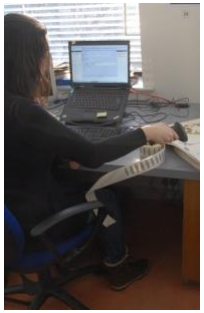


# Expanded Workflow

1. Minimal curation

2. Assign unique identifier (eg attach barcode)

3. Initial minimal data capture



4. Image specimen (camera or scanner)

**4a. Assess specimen condition**

4b. OCR processing

5. Additional data entry

5a. Additional curation

# 4a. Assessing specimen condition

- Condition assessment now integrated into digitisation process
- Poster on display

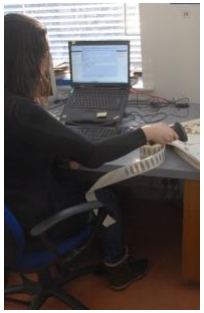
| CONDITION Action Required | | | | ACTION | | | RECORD ONLY No Action Required | |
|---|---|---|---|---|---|---|---|---|
| Non-archival material | Paper Problems | Risk of damage or loss | Insect Damage | Protective | Cover | Sent for Repair | Surface dirt | Stained Sheet |
| Cellophane capsules or polythene | Too flimsy to handle; crumbly; small sheets | Loose attachment or material | Grazed specimens, droppings, powder | GREY BOX | WHITE CAPSULE | Specimens Kate Eden will repair | Including soot, dirt | Insecticide residue |

# Expanded Workflow

1. Minimal curation

2. Assign unique identifier (eg attach barcode)

3. Initial minimal data capture



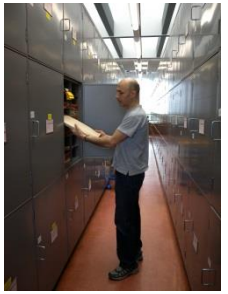
4. Image specimen (camera or scanner)

4a. Assess specimen condition

**4b. OCR processing**


5. Additional data entry

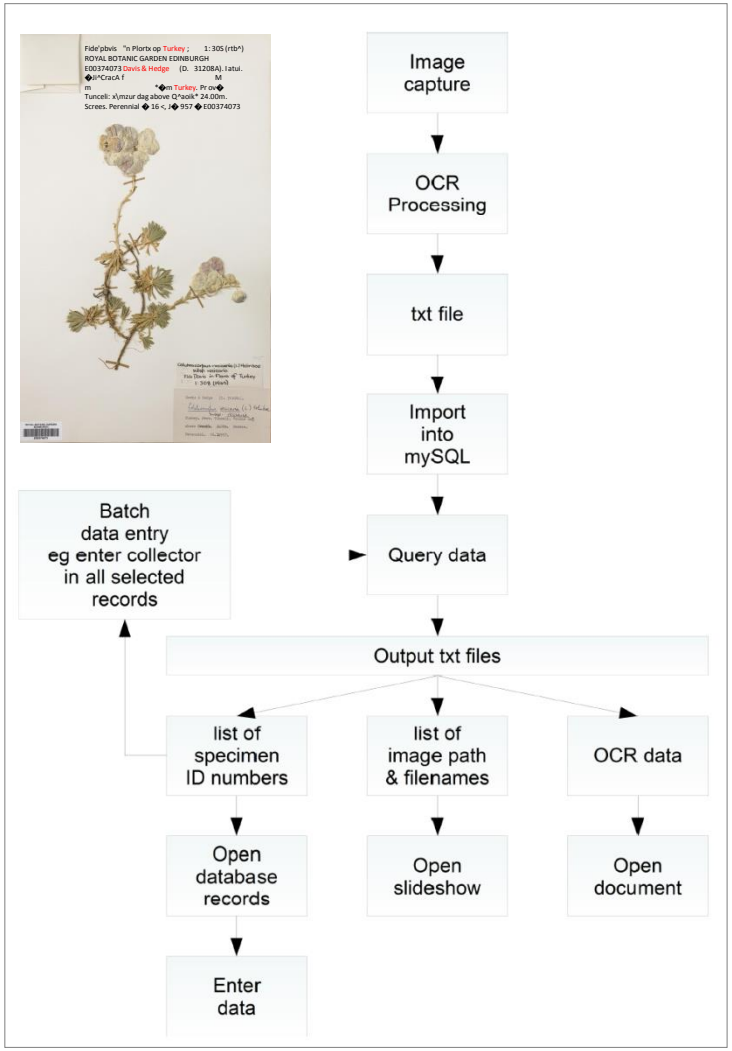
5a. Additional curation



# 4b. OCR processing

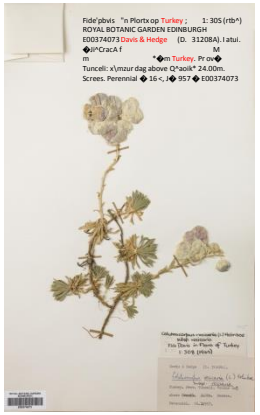

- Optical Character Recognition (OCR) is now integrated into the digitisation process
- OCR output is currently captured in a single, unparsed field in the database
- ABBYY Recognition Server version 3

# 4b. OCR processing




- Barcode checking
  - Against image filename
- Sorting and filtering specimens
  - Significantly increases efficiency
  - Data have been added to over 100,000 specimens in presorted batches
  - Drinkwater et al., 2014
- Finding types
  - Terms including typus, sp. nov., etc.
  - Link to Global Plants Initiative project
- Sorting label type by uncertainty %
  - Potential to sort typed vs handwritten

# 4b. OCR processing in the future




OCR output could be used for:

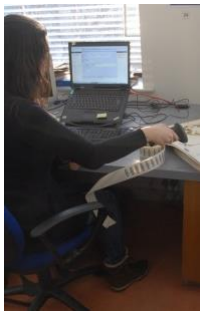
- Text mining to pull out labels which appear to have no recognisable text and which are potentially handwritten
  - These specimens could go into a different workflow incorporating handwriting recognition
- Text mining to sort specimens automatically into batches
  - Addition of data becomes project based
- Comparing with OCR output from other institutes to find duplicates
- Parsing into database fields

# Expanded Workflow

1. Minimal curation

2. Assign unique identifier (eg attach barcode)

3. Initial minimal data capture



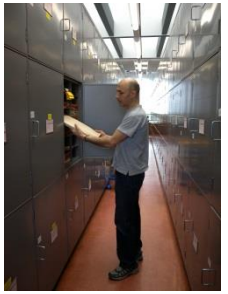
4. Image specimen (camera or scanner)

4a. Assess specimen condition

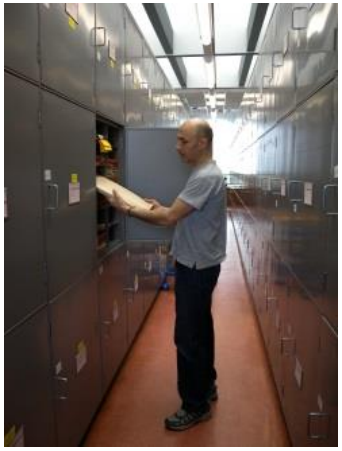
4b. OCR processing


5. Additional data entry

**5a. Additional curation**



# 5a. Additional curation



- Correcting specimens which have been filed under the wrong geographical region
  - May be caused by same name in two countries, eg Tripoli
  - May be caused by changing borders
  - May be caused by lack of concentration
- Emphasises link between digitisation and curation

# Collaboration

- iDigBio
  - Augmenting OCR Working Group
- Synthesys 3
  - Joint Research Activity (JRA) includes review and development of OCR within digitisation
- CETAF Digitisation Working Group
- Kew & Smithsonian
  - Finding duplicate specimens
  - Herbarium complementarity
- DINA
- OpenUp! & Europeana

# Acknowledgements


- Deb Paul and the iDigBio aOCR Working Group
- Martin Pullan and Roger Hyam, RBGE
- Simon Chagnoux, Paris & Stephen Gottschalk, NYBG
- Nicky Nicolson, RBGKew & Rusty Russell, SI
- Andrew W Mellon Foundation
- Scottish Government

# Dedicated to the digitisers at RBGE

Jaime Aguilar, Ruth Atkinson, David Bell, Boni Nieto Blazquez, David Braidwood, Cliodhna Ni Bhroin, Marie Briggs, Rebecca Camfield, Catherine Cooke, Anna Dennis, Robyn Drinkwater, Alan Elliott, Anna Dennis, Muhammad Ghazali, Lorna Glancy , Zoe Goodwin, Alan Gray, Lucy Head, Paulina Hechenleitner, Dorota Jaworska, Noreen Jennison, Neville Kilkenny, Cathy King, Lorna MacKinnon, Louise Olley, David Purvis, Markus Ruhsam, Nicky Sharp,  Natalia de la Torre, Helen Townsend/Rupp, Julia Weintritt