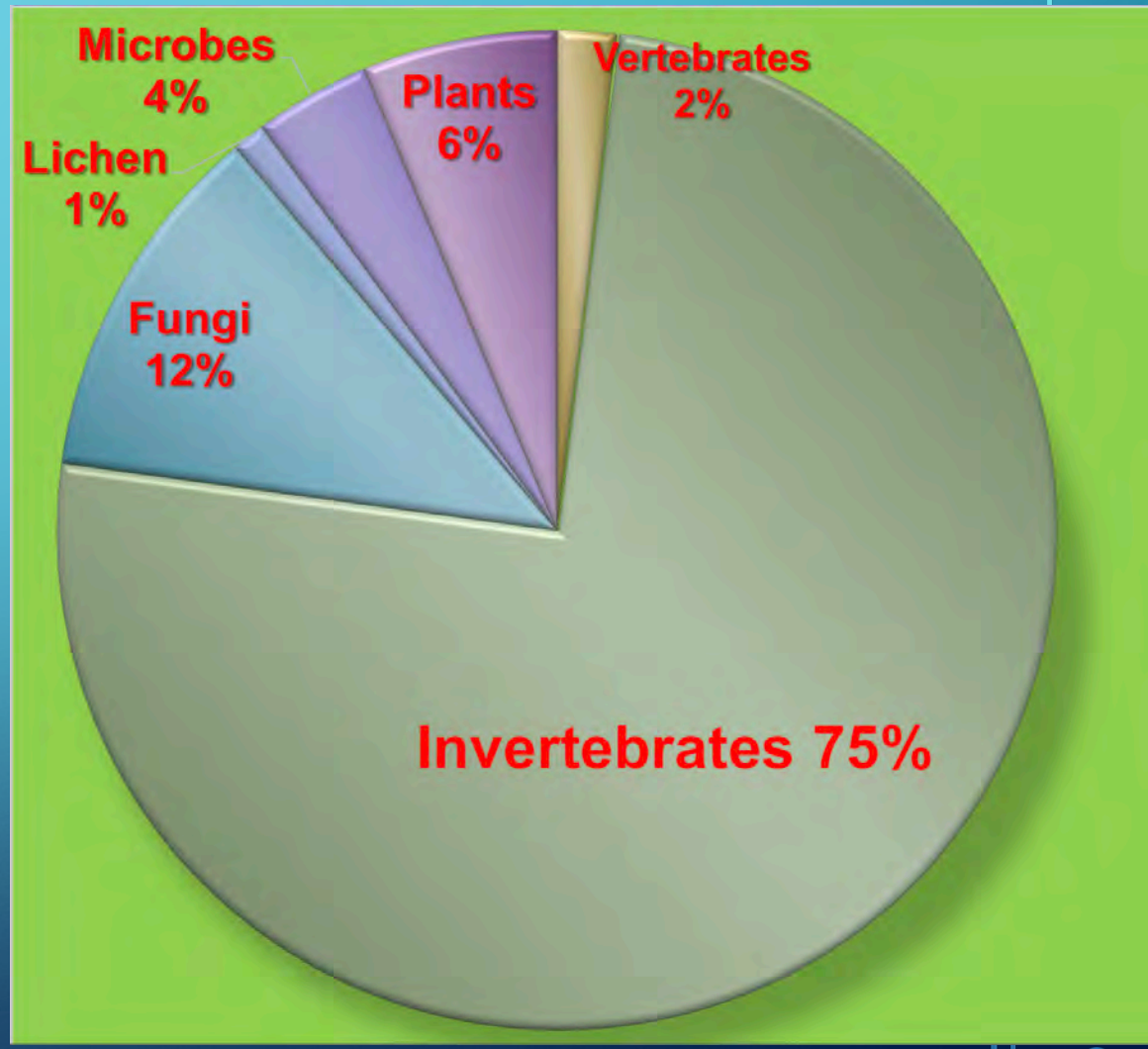
SURVEYING AND COLLECTING FUNGI

SANDRA TUSZYNSKA – THE MYCOLOGY RESEARCH PROJECT

LACK OF KNOWLEDGE

- Fungi knowledge = start of 20th Century for plants!
- Estimated 250 000 species in Australia
- 1500 macrofungi identified species in 465 genera
- 25% new species every foray
- Rarely studies and minimal funding
- Queensland Herbarium ~850 000 plants, algae - 12,000 macrofungi
- Citizen science to the rescue



IMPORTANCE OF FUNGI

- Soil creation and health
- Plant survival and health
- Decomposers
- Shelter and food for invertebrates
- Food and medicine for animals
- Mycoremediation
- Carbon sequestration

WHY COLLECT FUNGI FOR HERBARIA?

- ID of new species
- Research
- Source of material for scientific naming
- Special and temporal biodiversity record

NEXT GENERATION SEQUENCING OF ANCIENT FUNGAL SPECIMENS: THE CASE OF THE SACCARDO MYCOLOGICAL HERBARIUM

- Despite their essential role in the environment, number of known fungal species are low compared to recent estimates of fungal diversity (2.2 - 3.8 million species)
- Approx. 35,000 correctly identified fungal species are represented by DNA sequences in public databases
- A mere 1% of total number of species
- Curated DNA sequence data of properly identified voucher specimens is of fundamental importance to fill the present gap
- Mycological herbarium collections are important source for fungal DNA-barcoding
- Collection-based sequencing is a relevant priority for the coming decades

COLLECTING PERMITS

http://www.ehp.qld.gov.au/licences-permits/plants-animals/research-education/index.html

http://qldfungi.org.au/fieldtrips/collecting

https://www.qld.gov.au/__data/assets/pdf_file/0032/67478/fungi-coll-manual.pdf

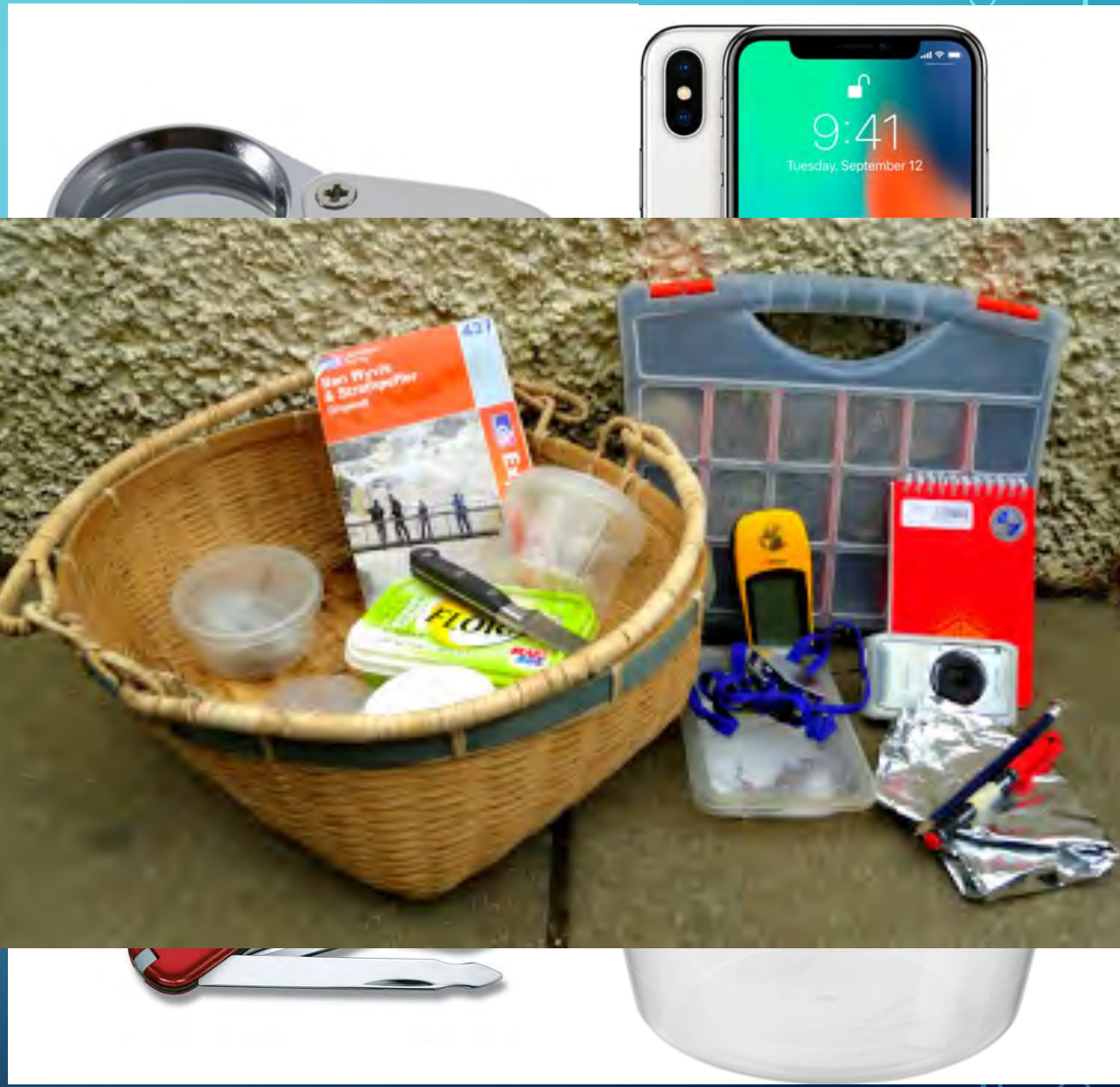
Department of Science, Information Technology and Innovation

Collecting and preserving fungi specimens, a manual

Queensland Herbarium

FORAY EQUIPMENT

- Camera and head lamp
- Notebook, pens, pencils,
- Brush
- Ruler
- Hand lens
- Mirror
- Pocket knife
- Scissors
- Trowel
- GPS unit or Smart phone
- Tags
- Storage containers
- Waxed paper or aluminium foil



COLLECTING FUNGI

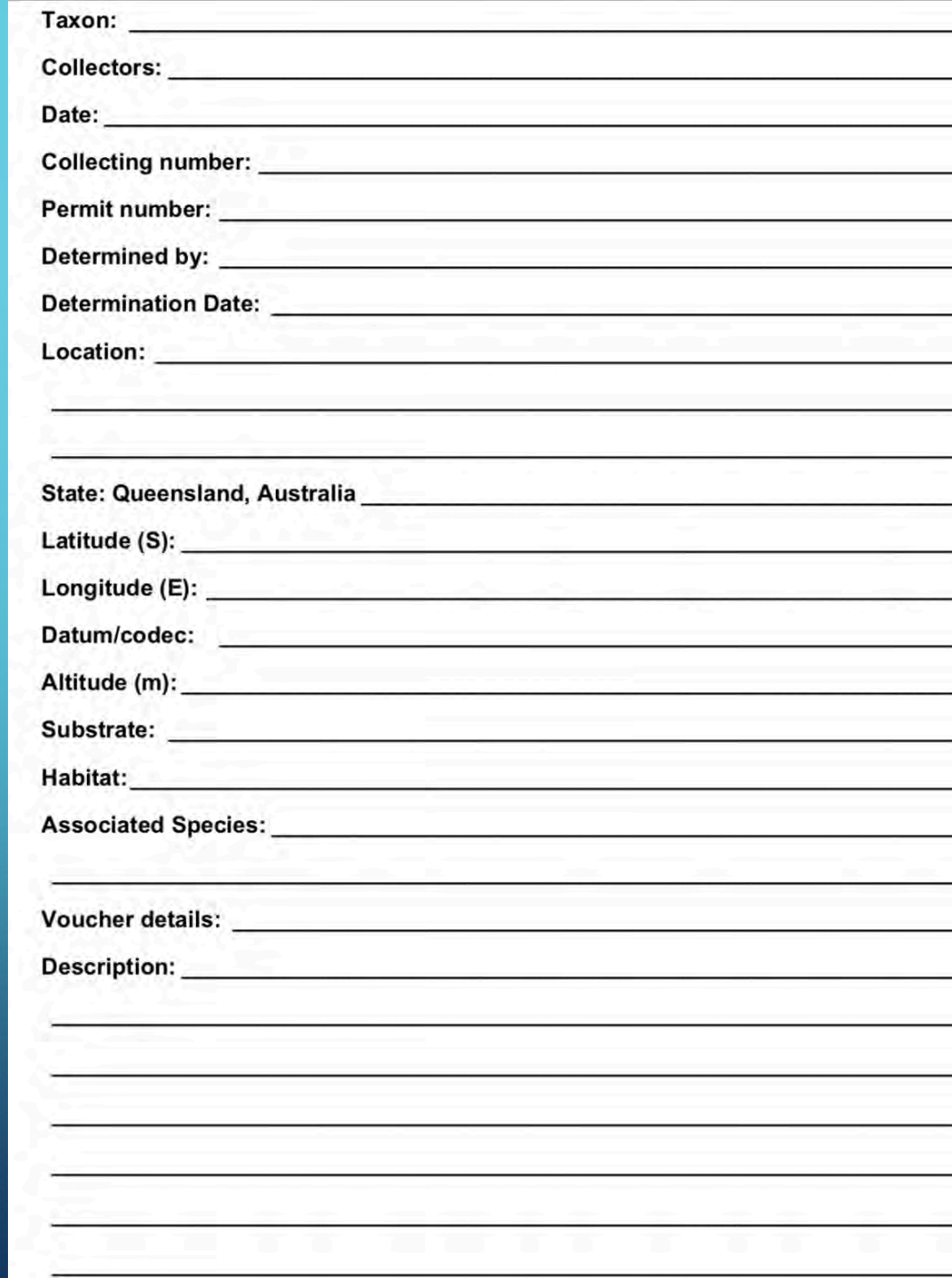
- Enough for destructive sampling
- Healthy specimen from the same patch
- Range of developmental stages
- How many can you process?
- Some fridge 48h
- Number depends on size
  - Tiny ones - 20+
  - Medium sized - 5-10
  - Very large – 1
- Consider a duplicate

COLLECTING FUNGI

- Keep the specimen intact
- Get the whole specimen and some substrate
- Keep specimen separate

FIELDNOTES

- Take as many notes as you can
- Use sheets available
- Key information:
  - Collectors name
  - Date
  - Location
  - Habitat
- Geocode- Latitude/Longitude
  - degrees, minute, seconds
  - create collecting numbers
- Field name for specimen
- Substrate type – soil, wood, leaf, seed…



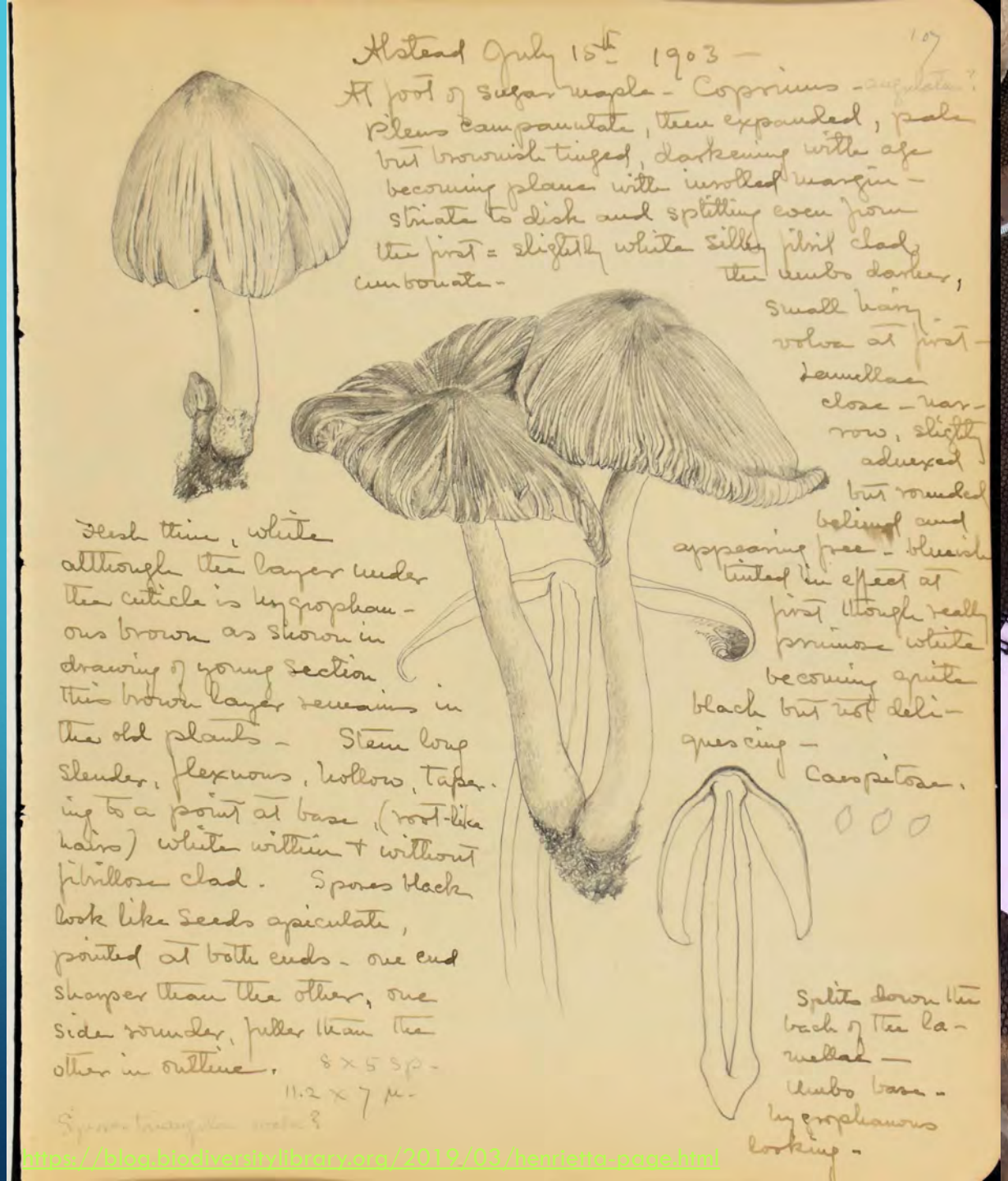
PHOTOGRAPHY

- As you found it
- Add number tag with scale
- Photograph all aspects
  - dressed
  - undressed
  - top side
  - underside
- Also record smell, colour change
- Light box
- Name all files - number, description

SPECIMEN DESCRIPTION

- Describe fresh specimen before drying
- Shape, size
- Diameter and height of cap and stipe
- Radius from substrate
- Measurements for various maturity levels
- Ornamentations – scales, warts…
- Margin type - even, undulated
- Cross section - gill attachment, colour, bruising
- Colour changes and odour

SPECIMEN DESCRIPTION DIAGRAM



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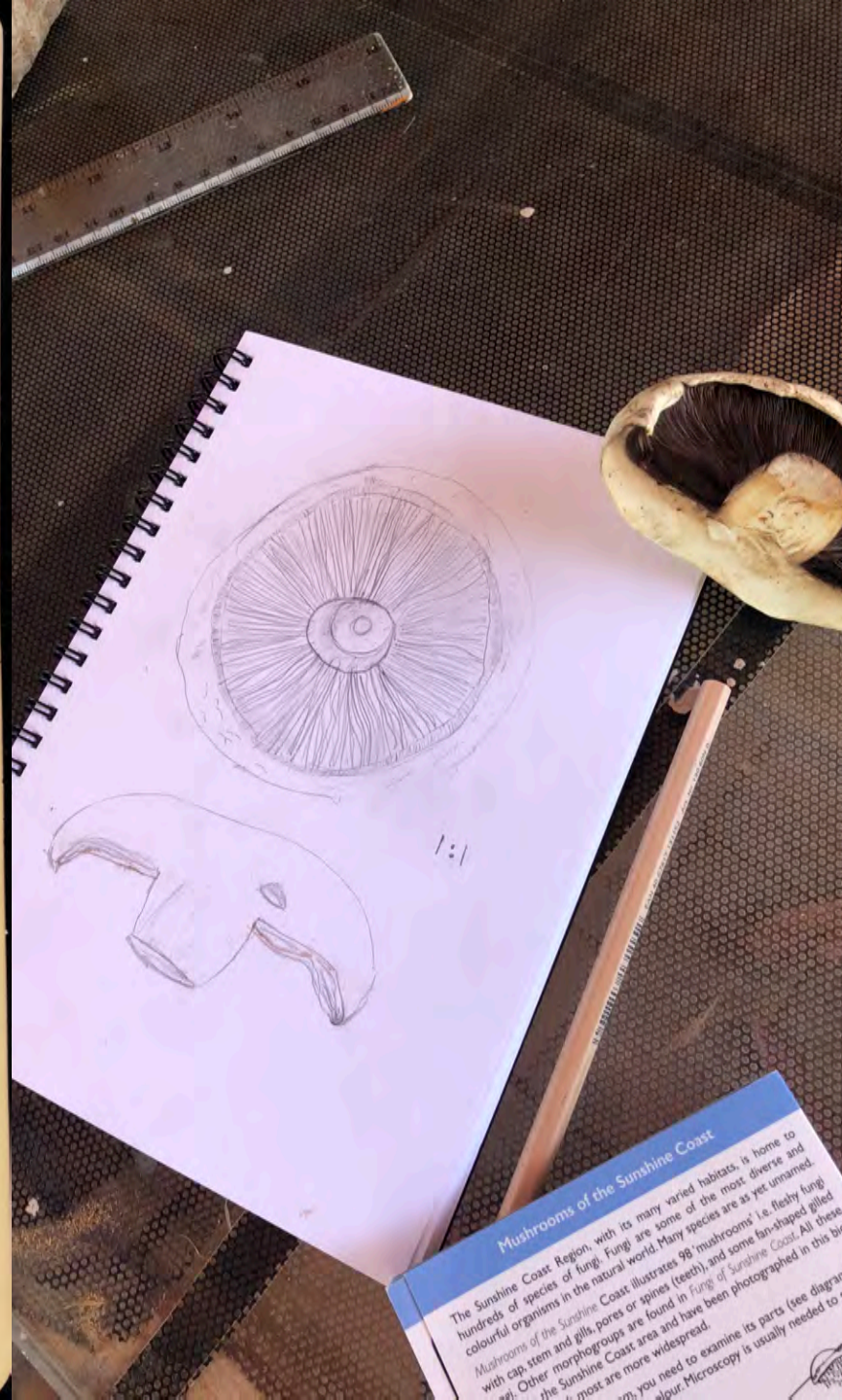

SPORE PRINT

- Place fruiting body, fertile surface down on white/black paper
- Draw a circle around it
- Cover with a container
- Check progress
- Fold in half and label with
  - collection number
  - collector and date
- Put on the dryer with specimen

SPORE PRINT

Figure 10 Making a spore print with stem intact (left), add wet tissue paper (middle) and cover (right)

Figure 11 Spore print on paper (left), on a glass slide (right)

Figure 12 Agaric *in situ* (left) and, as a specimen with spore print (right)

DRYING SPECIMENS

- Dehydrator
- Dry within 48 hours of collection
- Temperature 40-45°C
- Large fruit bodies to be cut into sections
- Keep the label with the specimen at all times

DRYING SPECIMENS

- Should be slightly crisp and brittle
- If still pliable, dry it more
- If big, weigh it, dry some more and reweigh until stable
- Place in Ziplock bag
- Add silica gel

STORAGE

- Ensure
  - paperwork is complete
  - all components of collection are together
  - photo printout -10x15cm
- Electronic data accepted
- Place specimen & spore print in inner bag
  – paper, envelope
- Place in another bag with paperwork
- Provide as much info and be as tidy as you can
- Sterilise everything with 70% Ethanol between and after handling
- Send off or deliver to QH – protect in a box and bubblewrap
- Enjoy!

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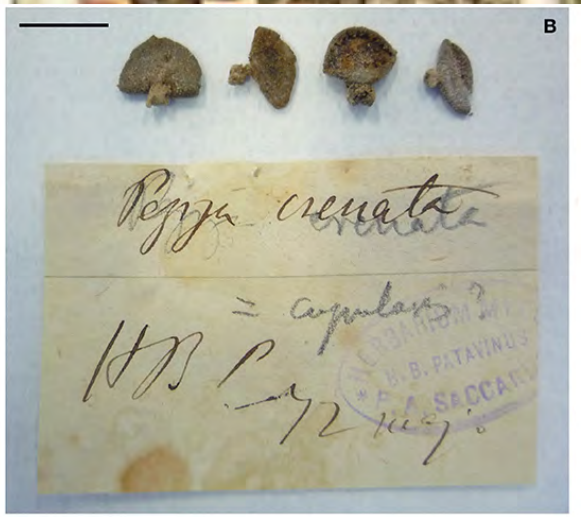

JOIN QMS FORAYS

Fungi Record Sheet

Kind of fungus (e.g. mushroom, bracket)	Name of fungus (if known)	Number of fruit bodies seen	Describe where the fungus was found	Draw a picture of the fungus

Ref:	
Date:	
Collector:	
Locality:	
Elevation:	
Habitat:	
Assoc. species:	
Substrate:	
CAP -	
Width:	
Height:	
Texture:	
Surface:	
Peeling:	
Colour:	
Margin:	
STIPE	
Colour:	
Height:	
Attachment to substrate:	
Width:	
Texture:	
Shape:	
Ring:	
Volva:	

GILLS – Cream
[drawing / macro image]

Arrangement:	
Attachment:	

FLESH	
Colour:	
Smell:	
Colour Change:	

SPORES @ 40x

[image of spores]

Shape:

NOTES:	
SPECIES	

[INSERT IMAGES IN THIS COLUMN]

Interesting Spore Facts

Below is an excerpt from the 'Fungi Files' educational resource (p31), offering an overview of the prolific nature of fungi spores in the environment.

"At any given time, the air we breathe is filled with the spores of many different types of fungi. They form a large proportion of the "flecks" that are seen when direct sunlight shines into a room. They are also remarkably small; 1800 spores could fit lined up on a piece of thread 1 cm long. Fungi typically release extremely high numbers of spores at a time as most of them will not germinate due to landing on unfavourable habitats, being eaten by invertebrates, or simply crowded out by intense competition. A mid-sized gilled mushroom will release up to 20 billion spores over 4-6 days at a rate of 100 million spores per hour. One specimen of the common bracket fungus (*Ganoderma applanatum*) can produce 350 000 spores per second which means 30 billion spores a day and 4500 billion in one season. Giant puffballs can release a number of spores that number into the trillions. Spores are dispersed via wind, rain, water currents, insects, birds and animals and by people on clothing. Spores contain little or no food so it is essential they land on a viable food source. They can also remain dormant for up to 20 years waiting for an opportune moment to germinate."