General Protocol for Processing Scanned Image

Chien Chen 17.10.2024

1. **Drag the Stem Image into ImageJ**

2. **Create 04_OuterRing_Mask.tif**
   - Please follow: **Protocol for Tree Ring Marking via ImageJ.**

3. **Pre-Process Image by ImageJ**
   - Use the target Image opened in the ImageJ,
   - Navigate to **Plugins / Macros / Run...**
   - Select the Macro file: "**Tree-Ring_Pre-Processing Steps.ijm**"
   - The relevant data inputs for R Scripts will be generated & saved in the folder.
   - ps.
     Specific parameters can be edited by:
     Navigate to: **Plugins / Macros / Edit... /**
     select Macro file: **"Tree-Ring_Pre-Processing Steps.ijm"**

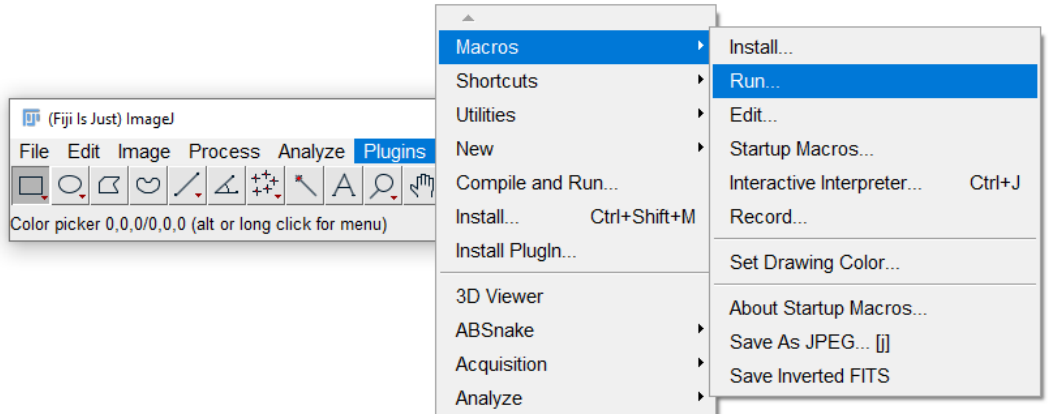

Fig.01 Navigation to run Macro files.

4. **Delineate Tree Ring Structures by R**
   - Run R scripts for delineating tree ring structures & generate "**ring_auto.csv**"
   - R-Script file: "**Detection Code.R**"
   - Please note that:
     (1) This step takes some time;
     (2) Adjust the R-script according to the personal work directory.
     (3) The work directory should be the same as the folder with targeted stem image & all processing scripts/ Macros.

5. **Import Tree Rings into ImageJ**
   - Open ImageJ with the targeted stem image (if closed).

- Run Macro to input tree ring structures as ROI files into ROI Manager.
- Navigate to: **Plugins / Macros / Run...**
- Select the Macro file: "**R_2_ImageJ.ijm**".

6. **Post-Process Tree Rings Manually by ImageJ**
   - Select each tree ring structure from the ROI Manager and check their structures accordingly. For any wrong delineation, use “Selectin Brush Tool” to adjust the R-detected results:
   - **Select the ROI with mistakes / use “Selectin Brush Tool” for adjustments / ROI Manager / Update**
   - Save the Updated ROI objects by:
   - **ROI Manager / Select all ROIs of tree rings / More >> / Save...**

7. **Import Revised Tree Rings into R (Optional)**
   - In case the updated tree-ring structure data is needed to be back into R, Navigate to: **Plugins / Macros / Run...**
   - Select the Macro file: "**ExtractROICoordinate.ijm**"
   - **Save** the pop-up table as "**Results.csv**"
   - In R-Script "**Detection Code.R**", **Section [2]-(5)**,
   - There are supportive lines to translate the csv file from ImageJ to R.
   - Remember to also import the targeted Image into R as "**im**" as **matrix format** and source relevant function script “**Functions_Data Conversion.R**”.