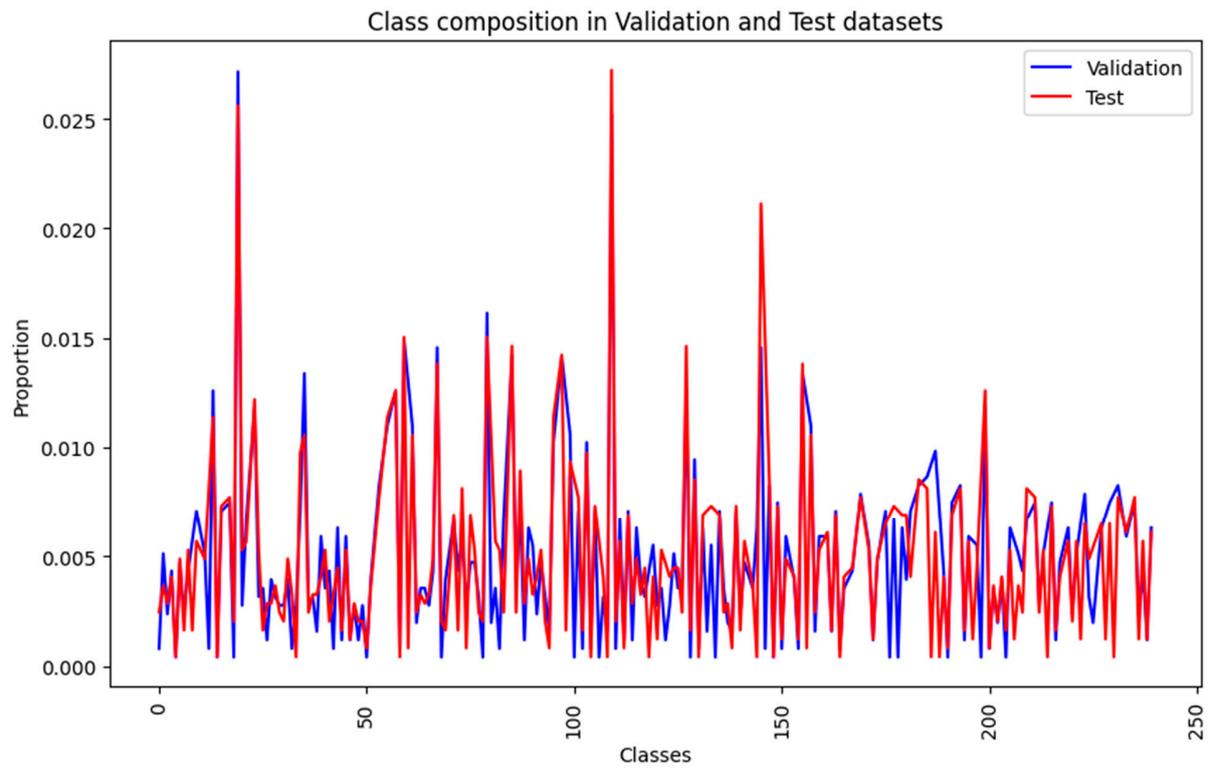
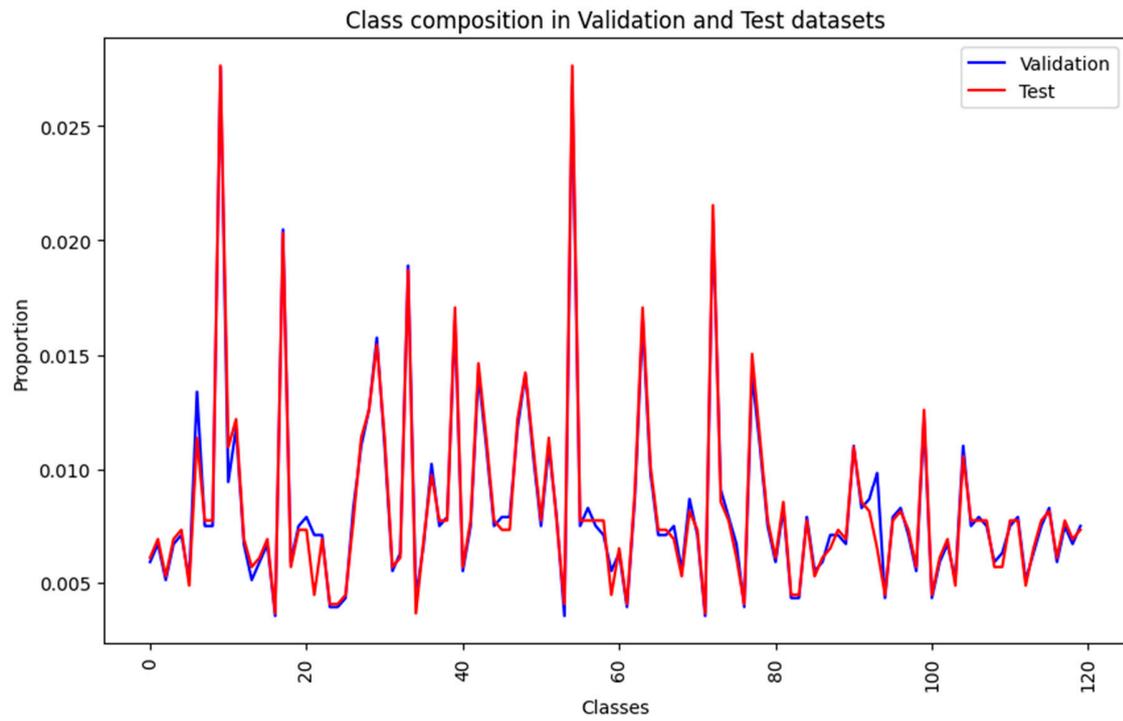


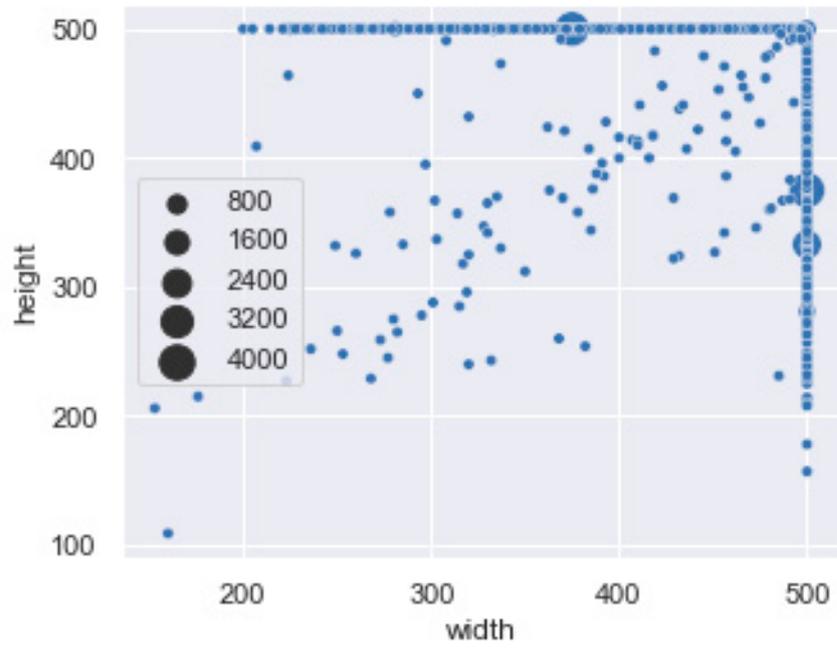
Figure S1. The graphical representation of spider data distribution at the genus level (% on genus and image count) which was obtained based on data from TBN (Taiwan Biodiversity Network, <https://www.tbn.org.tw/taxasearch>, accessed on July 27th, 2022) and the WSC (World Spider Catalog, <https://wsc.nmbe.ch/>, accessed on July 27th, 2022). Around 58% of spider genera found in Taiwan accounted for 99.69% of images across the available databases.



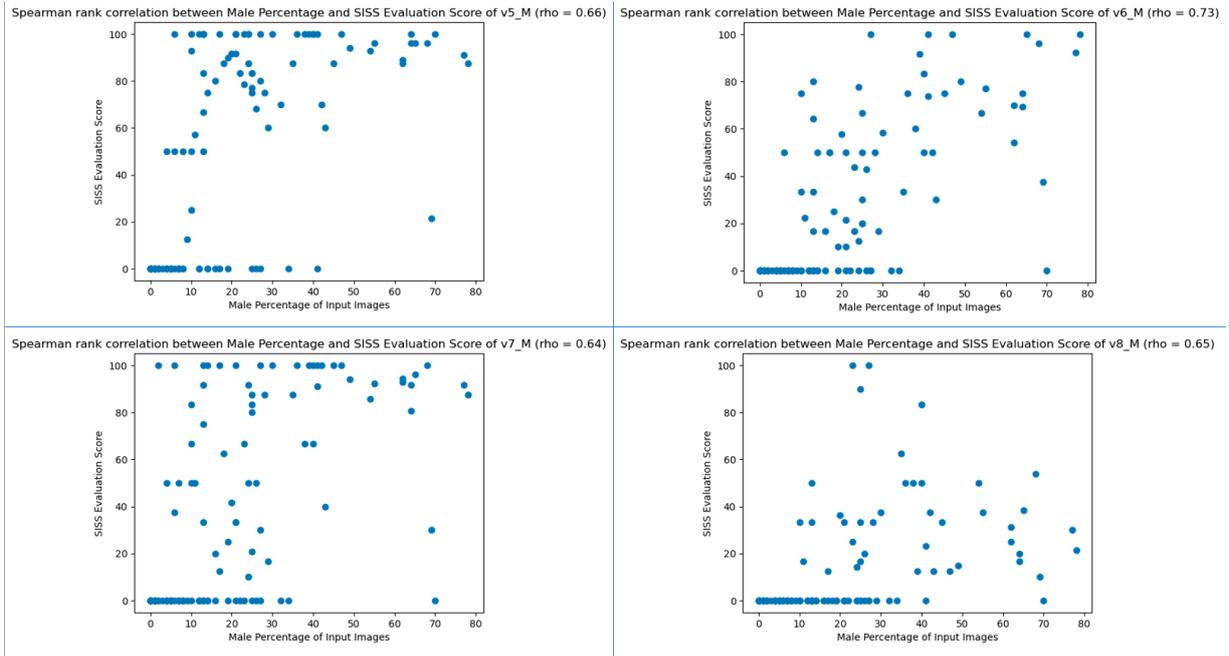
Supplemental S1-B. Class composition in Validation set and Test set of WG dataset before balancing augmentation.



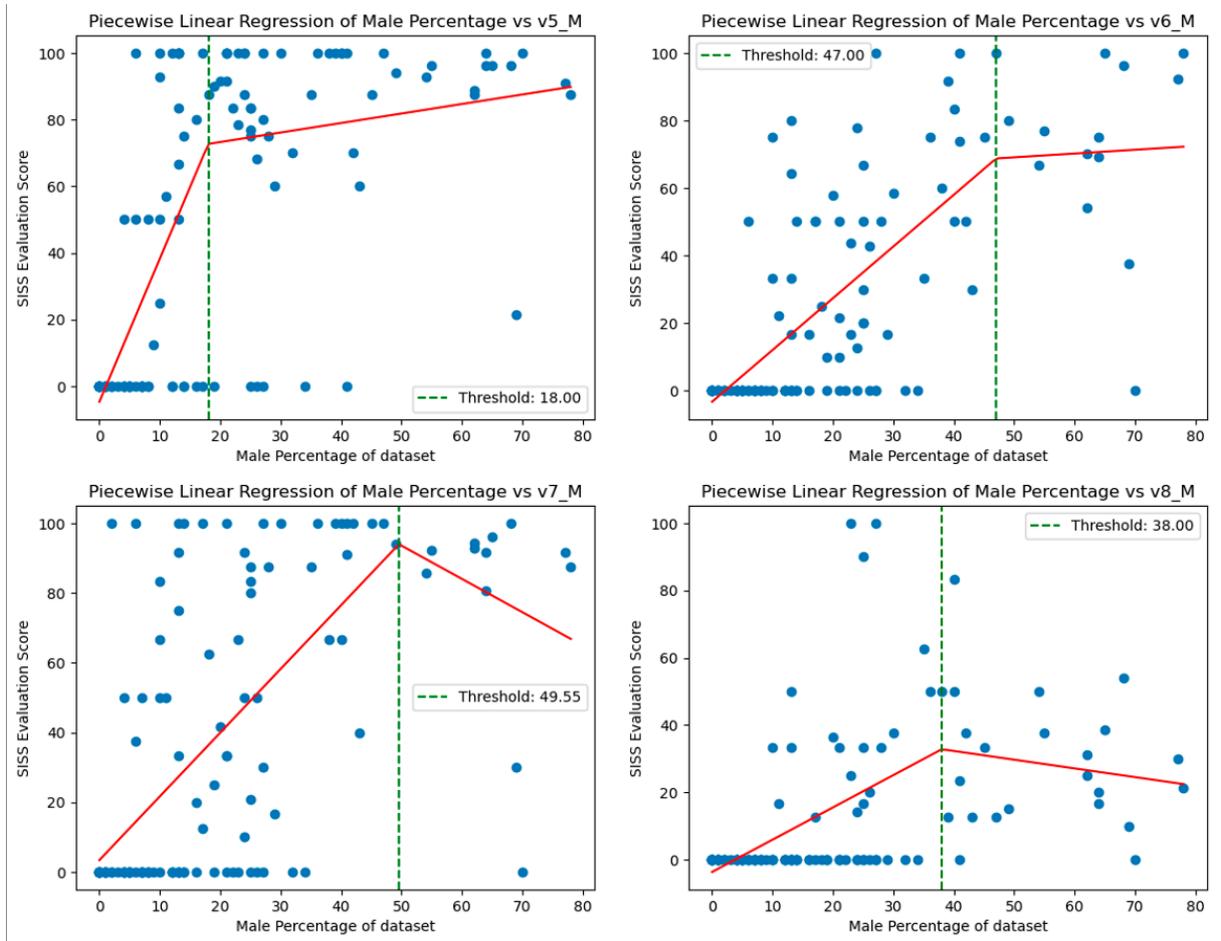
Supplemental S1-C. Class composition in the Validation set and Test set of NG dataset before balancing augmentation.



Supplemental S1-D. Image sizes analysis, width and height values distribution of the total dataset.



Supplemental S1-E. Spearman rank correlation between Male Percentage and SISS Evaluation Score for male spiders per genus, evaluated on 4 WG models: YOLOv5_WG (v5_M), YOLOv6_WG (v6_M), YOLOv7_WG (v7_M), and YOLOv8 (v8_M). Each Spearman rank correlation coefficient (ρ) ranges between 0 and 1, with values closer to 1 than 0, indicating a strong positive correlation between the examined pairs ($P < 0.0001$).



Supplemental S1-F. Piecewise linear regression model between Male Percentage and SISS Evaluation Score on male spiders per genus, tested on 4 WG models: YOLOv5_WG (v5_M), YOLOv6_WG (v6_M), YOLOv7_WG (v7_M), and YOLOv8 (v8_M). The piecewise threshold represents the breakpoint in the Male Percentage where the relationship between the Male Percentage and the SISS Evaluation Score changes. For each model, the threshold indicates the point at which the trend in the SISS Evaluation Score switches from increasing to decreasing or vice versa as the Male Percentage increases. By identifying these thresholds, researchers can better understand the relationship between the Male Percentage and the SISS Evaluation Score across different models and gain insights into the performance of these models at various levels of Male Percentage.