# GEOGRAPHICALLY DISTINCT BUT NON-MONOPHYLETIC MORPHS: REEXAMINING THE EVOLUTION OF COLOR IN FLORIDA BURROWING BEETLES (COLEOPTERA: GEOTRUPIDAE: *PELTOTRUPES*)

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**Geographically distinct but non-monophyletic morphs: Reexamining the evolution of color in Florida burrowing beetles (Coleoptera: Geotrupidae: *Peltotrupes*)**

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ABSTRACT - The genus *Peltotrupes* Blanchard 1888 (Coleoptera: Geotrupidae) is restricted to scrub and sandhill habitats on peninsular Florida's ridge system. Commonly called Florida Deep Digger Scarabs, individuals excavate burrows as deep as 2-3 m and were traditionally considered to be flightless. The recognized diversity within the genus (*P. profundus profundus* Howden 1952, *P. p. dubius* Howden 1955, and *P. youngi* Howden 1955) is based mostly on structural color differences corresponding to distinct geographic regions (i.e., dune ridges). Herein, we provide the first molecular phylogeny of the genus *Peltotrupes* and highlight the lack of monophyly of the currently recognized species (i.e., color morphs). We also analyze the color of four dorsal regions of male individuals representing the full geographic and color phenotypic breadth of the genus. Although significant color differences are recovered between the currently recognized species, given their lack of monophyly, our results suggest an ecological role may be maintaining these distinct morphs.

Acknowledgments

I would like to thank the following people for their contributions and support to the completion of this thesis: Dr. Michael Brewer, Dr. Trip Lamb, the Department of Biology, and East Carolina University. Without the advising and guidance of Dr. Michael Brewer, my research professor and project advisor, I would have been unable to proficiently complete this project. Further, the support and guidance from Dr. Trip Lamb were beneficial to the completion of this project. Additionally, I would like to thank the NC State University Insect Museum and the University of Michigan Museum of Zoology for their generosity in sharing their *Peltotrupes* collections for our research.

## Table of Contents

## Appendix

## List of Figures

## Introduction

**Background:** The beetle genus *Peltotrupes* (Blanchard, 1888) is native to peninsular Florida and is composed of two species, *P. profundus,* and *P. youngi (*Howden, 1952). They are seemingly flightless beetles and are known for their iridescent coloration. Additionally, they are known as deep digger scarab, and dig deep burrows to rear their young and inhabit during the day time. Along with these species, there is a subspecies, *P.p dubius* (Howden, 1955). Although *P.p. dubius* subspecies has been classified as a subspecies of *P. profundus*, this was originally dismissed and has been questioned since. These species were once classified under the genus *Geotrupes*, but this was changed to *Peltotrupes* by Henry Howden after he divided the genus into the two species: *profundus* and *youngi* (Howden, 1952). *Peltotrupes profundus* generally have a purple coloration along their elytra while *P. youngi* are typically green. The independent species within Peltotrupes with their robust, iridescent-coloration occupy separate geographic regions within central Florida (Kalisz, et al., 1984). Additionally, degree of coloration and other anatomical structures make these beetles sexually dimorphic (Howden, 1955).

Figure 1. *P. youngi* in sandhill habitat.

Figure 2. P. *p. profundus* in sandhill habitat.

These beetles are considered to be distinct species; however, through recent molecular phylogenetic analysis (Brewer lab) indicates the two species are not reciprocally monophyletic. These new data raise new questions regarding their physical characteristics that distinguish the species. Given the inconsistencies between genetic and morphological data, the purpose of this study was to examine color variation within and between the two species.

Figure 3. *Peltotrupes* mound habitat.

Figure 4. Up-close mound and burrow entrance.

**Research Questions:** (1) Do the nominal Peltotrupes taxa comprise reciprocally monophyletic groups? (2) Does the minor coloration used to delineate species and subspecies significantly differ?

## Methods

**Collection:** Beetle specimens were collected from sandhill regions throughout peninsular Florida, and specimen names, species, and localities were recorded in Excel (Table 1). These beetles were collected in pitfall traps (buried coffee cans baited with sucrose/yeast mixture).

**Molecular Work:** Beetles collected were euthanized and pinned, and the right rear leg was removed for DNA extraction using Qiagen's DNeasy kit. After extraction, the cytochrome oxidase 1 (COX1) and cytochrome oxidase 2 (COX2) genes were amplified using Polymerase Chain Reaction (PCR). After additional clean up and gel electrophoresis, the samples were sequenced, and a SPLITSTREE phylogenetic network of mitochondrial haplotypes (Figure 8).

**Photography:** We generated composite photographic images for 101 male *Peltotrupes* beetle specimens representing the wide-range distribution of the genus for color analysis. Specimens were photographed using a Canon 6D camera under controlled light settings to minimize glare and ensure all specimens had similar lighting. Eight to twelve photographs were taken of each specimen and were exported to Helicon Focus, which pieced all images together to create one high definition composite image used for color analysis.

Figure 5. High-definition photograph of *Peltotrupes youngi*. Image used for color analysis.

Figure 6. High-definition photograph of *Peltotrupes p. profundus*. Image used for color analysis.

Figure 7. High-definition photograph of *Peltotrupes p. dubius*. Image used for color analysis.

**Color Analyses:** Composite images were exported to GIMP, a photograph editing software. The GIMP "color-picker" tool was used to measure RGB values for four dorsal areas of each specimen and a standardized grey background. The four dorsal areas included: lateral elytrum, edge elytrum, anterior, and head (Figure 8). RGB values standardized by dividing each value by the corresponding grey background value, then multiplied by 255, the RGB value of white (The protocol of measuring color values is described in the Appendix). RGB values were then converted to hexadecimal values and integer values using the R packages RGB and STROI to provide single

continuous values for analysis. Specimens, grouped by taxon, were subjected to ANOVA, followed by Tukey's post-hoc tests in R. Lastly, principal component analysis (PCA) was used to cluster taxa using all four dorsal measurements and subjected PERMANOVA to test for differences between taxa (999 iterations).

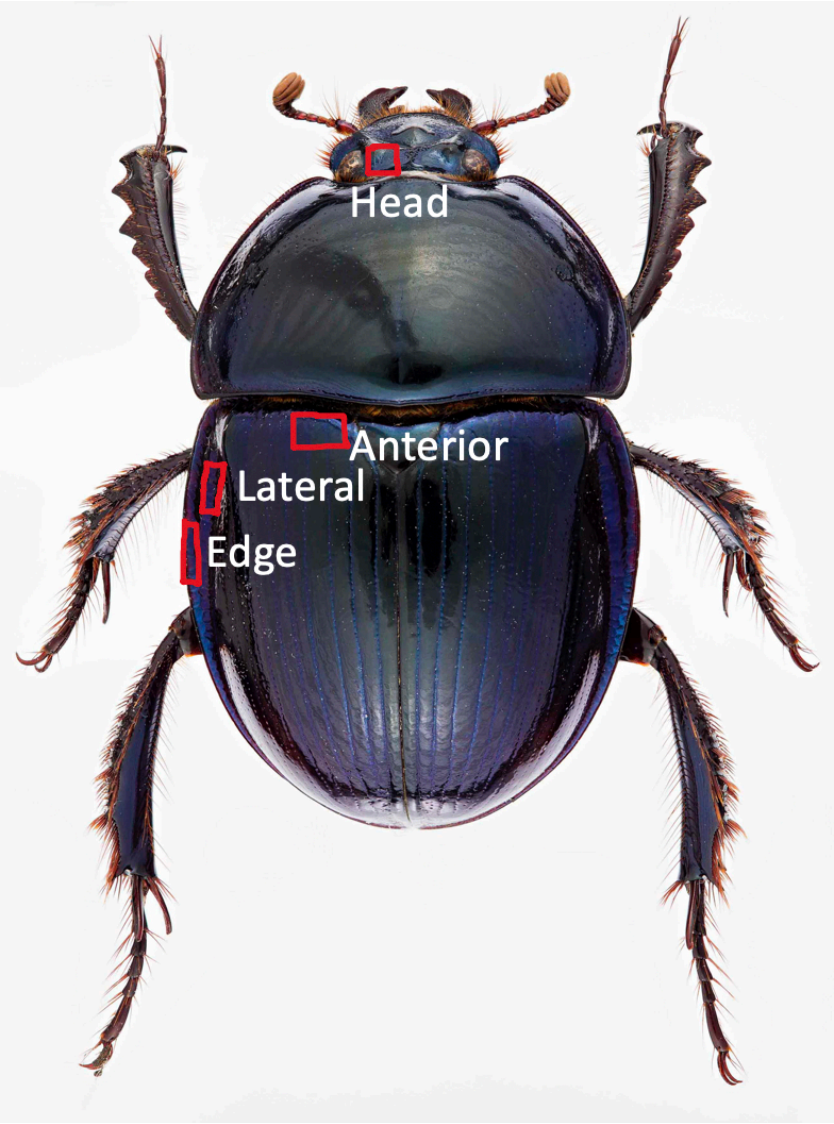


Figure 8. *Peltotrupes profundus* illustrating locations measured for color.

## Results

**Brief Synopsis of Molecular Work:** The SPLITSTREE phylogenetic network revealed phylogeographic structuring among mtDNA haplotypes, with four distinct phylogroups (Figure 9). However, none of the three nominal taxa were resolved as being monophletic. Instead, all of the haplotypes representing *P. youngi* and *P.p. dubius* clustered with those of *P. p. profundus* from the northern portion of its geographic range .

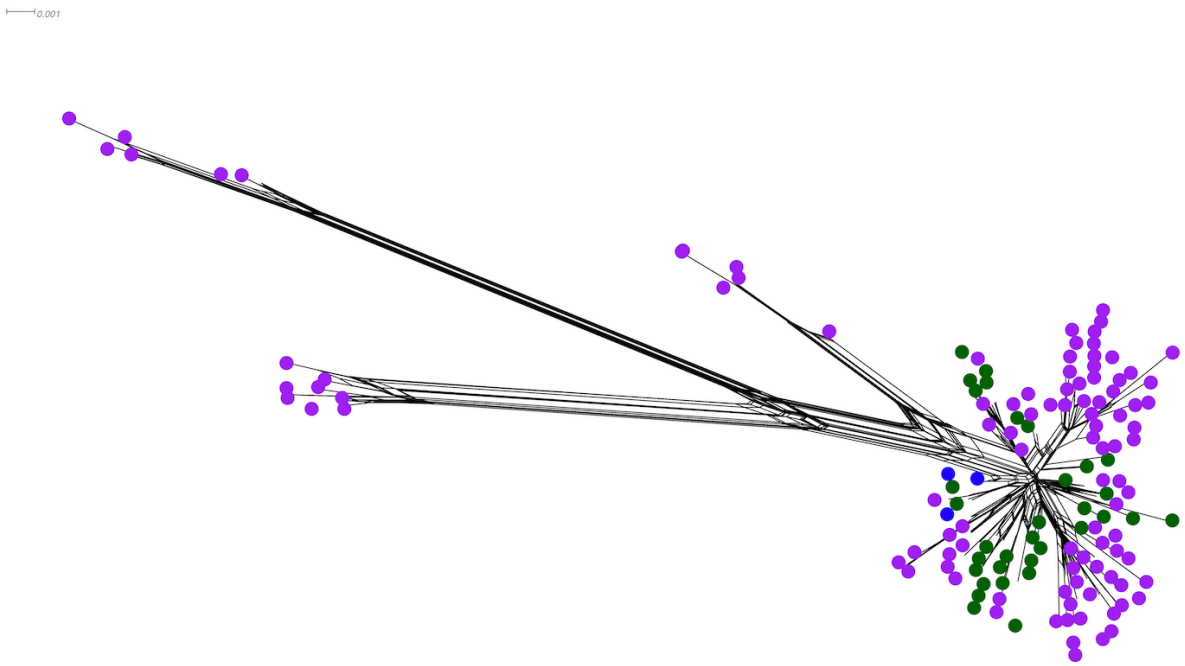


Figure 9. SPLITSTREE phylogenetic network of mitochondrial haplotypes. Tip labels are color coded as *P.p. profundus* (purple), *P.p. dubius* (blue), and *P. youngi* (green).

**Color Analysis:** Color morphs (i.e. species) appear to comprise distinct entities. Further, the "lateral" and "anterior" elytral areas best differentiate these morphs based on p-values from statistical tests (Figure 10). The lateral region separated *P.p. profundus* and *P. youngi* significantly, while the anterior region separated *P. youngi* and *P.p. dubius* as well as *P.p. profundus* and *P. youngi* significantly. PCA clustered taxa based on the four dorsal regions, and PERMANOVA showed differences in taxa through statistical analysis. Based on this test, *P. youngi* and *P.p. dubius*

are separated significantly based on color morphs, as well as *P.p. profundus* and *P. youngi* (Figure 11).

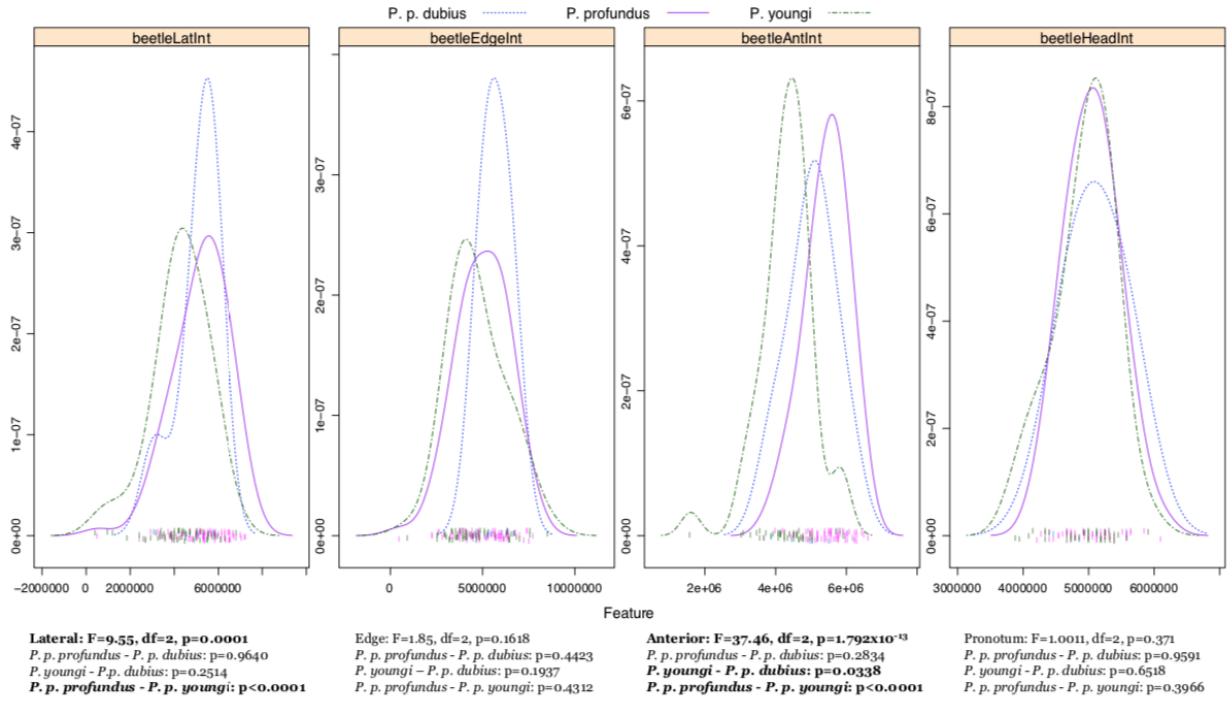


Figure 10. Color frequency distributions (as integers) for the four dorsal regions and associated statistical results. Taxa were compared via ANOVAs and results were investigated using Tukey's *post-hoc* test. Significant results are bolded.

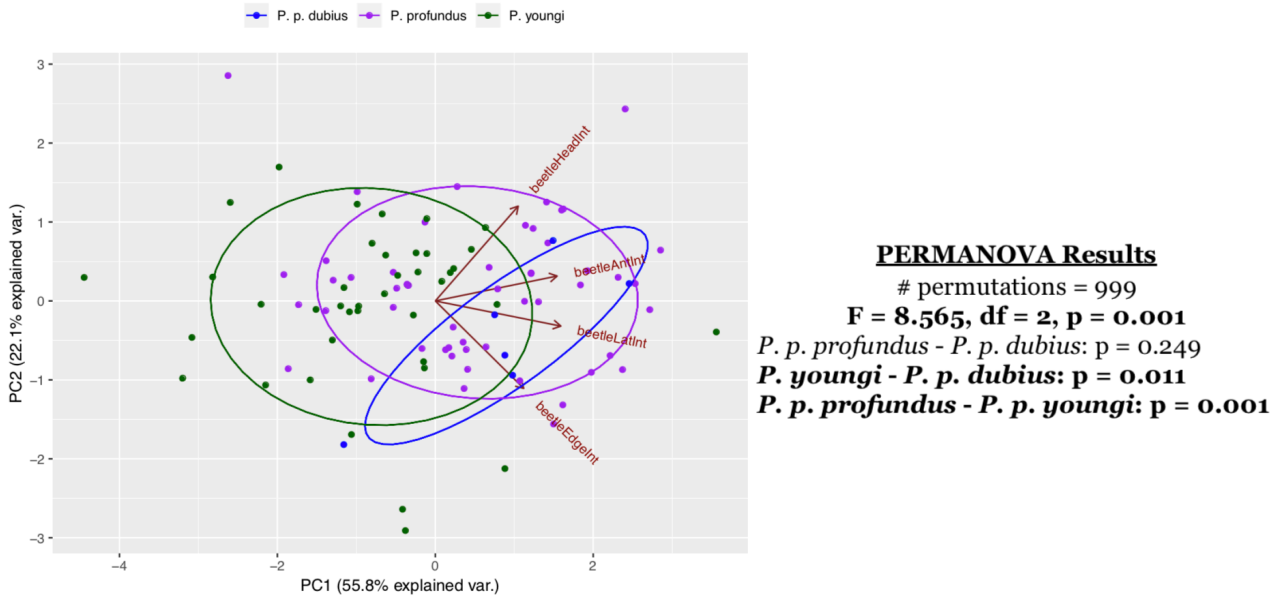


Figure 11. Principle component analysis and PERMANOVA results for color measurements. Significant results are bolded.

## Discussion

Although the mitochondrial gene analysis did not support the monophyly of the three taxa of *Peltotrupes*, their color morphs appear to comprise distinct entities. While these taxa are not supported genetically, they are supported through their color morphs. Interestingly, these beetles are burrowers and spend their time above ground in darkness (Howden, 1955). Further, the iridescent coloration that distinguishes them is structural, meaning it is caused by light rather than pigment. With this knowledge, it is interesting to see how strongly color separates these burrowing beetles, while mitochondrial genetic analysis does not. Although these beetles inhabit geographically distinct regions, there is no phylogenetic structure defining the distinct species. These inconsistencies and the results from the color analysis raise a new question: why do discrete color morphs exist despite apparent presence of gene flow?

## Conclusion

The analysis of genetic relationships among defined species and subspecies of *Peltotrupes* showed that these taxa are not monophyletic, as was previously thought. However, distinct coloration does appear to distinguish them, particularly from the "lateral" and "anterior" elytral regions. The ANOVA and the PERMANOVA results support significant differences between *P.p. profundus* and *P. youngi* as well as between *P.p. dubius* and *P. youngi.* However, no significant differences were observed between the subspecies *P.p. profundus* and *P.p.dubius*. Differences in the genetic and morphological results lead us to believe that an ecological role is at play in maintaining the distinct color morphs.

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## Appendix

### Peltotrupes Color Measurement Protocol

**DO NOT TAKE MEASUREMENTS WHERE THERE IS A GLARE ON THE SPECIMEN**

Step 1. Open GIMP.

Step 2. Select a file to edit.

- Select "okay" for TIFF image Message pop up and select "convert" for Convert to RGB Working Space.

Step 3. Once file is open, zoom in on location being measured (*command, scroll*) and select the "Color Picker Tool". **Note: this looks like an eyedropper.**

- After selecting tool, mark "sample average" box of the bottom left toolbar, so the radius can be adjusted.
- Mode should be on "set foreground color".

Step 4. Adjust radius to 50 and select an area of grey near specimen, but be sure the area is consistent without any difference in coloration or brightness. **Note: the best place is usually right above the head, to the right of the first leg.**

- To get the RGB data of the area, use the method: "shift key, command key, and click" and the values will appear in a small box.
- Record grey measurements for red, green, and blue in spreadsheet for lateral, edge, anterior, and head.

Step 5. Adjust radius to 10 and select area of the elytrum along the edge where color is most reflective/colorful. Color is most consistent/standard in the thickest part of the lateral area.

- There will be two measurements for this area-one along the lateral (inside ridge) and one along the very edge of the elytrum. **Note: there is a definite "ridge" that separates the lateral and edge measurements.**
- Collect the RGB values for both areas of measurement and record them in the spreadsheet (one under "lateral" and the other under "edge").
- **Note: the radius may need to be adjusted to a smaller size in order to get a clean measurement of the edge. **MAKE SURE TO GET A CLEAN, CONSISTENT SAMPLE****

Step 6. Keep radius at 10 and select area at the top of the elytrum, right as it is joined to the thorax.

- Pick a spot where the color is reflective and colorful and record the RGB values in the spreadsheet

- **Note: count 4-6 lines left of the center of the elytra and get a measurement in this vicinity.**

Step 7. With the radius still at 10, select area at the base of the head (right where the head and thorax connect).

- Pick a spot (without glare) between the center of the head and the left eye and record RGB values into spreadsheet.

Step 8. To measure the data in Excel, type "=" and then the cell number of the color of the sample and divide that by the cell number of the same color for the grey measurement. Once doing the first box for the correction, you will be able to shift down the same formula.

- **EXAMPLE:** To get the corrected value for each RGB value, if the R value for grey measurement is 205 (and in cell B3), and the R value for the "lateral" measurement is 132 (and in cell C3), then in the cell for the corrected value, write "=C3/B3" and "enter".
- **NOTE:** this should give a small decimal value→ once getting this value, drag the bottom right corner of the cell across to get the rest of the Green and Blue values, and then drag down to do the same for the remaining samples of each specimen.
- Do the same thing for the edge, anterior, and head recorded measurements.

| | Grey - Lateral | | | Sample - Lateral | | | Corrected RGB - Lateral | | | Standardized RGB - Lateral | | | Species |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample | R | G | B | R | G | B | R | G | B | R | G | B | |
| P120 | 211 | 203 | 192 | 84 | 63 | 91 | 0.39810427 | 0.31034483 | 0.47395833 | 90 | 67.5 | 97.5 | *P. profundus* |
| P142 | 202 | 193 | 181 | 65 | 97 | 114 | 0.32178218 | 0.50259067 | 0.62983425 | 60.0543478 | 89.6195652 | 105.326087 | *P. youngi* |
| P002 | 201 | 190 | 178 | 35 | 81 | 104 | 0.17412935 | 0.42631579 | 0.58426966 | 40.5681818 | 93.8863636 | 120.545455 | *P. youngi* |
| P008 | 202 | 192 | 181 | 66 | 47 | 84 | 0.32673267 | 0.24479167 | 0.4640884 | 85.4314721 | 60.8375635 | 108.730964 | *P. youngi* |
| P009 | 179 | 165 | 144 | 30 | 58 | 82 | 0.16759777 | 0.35151515 | 0.56944444 | 45 | 87 | 123 | *P. youngi* |
| P010 | 194 | 183 | 169 | 56 | 86 | 129 | 0.28865979 | 0.46994536 | 0.76331361 | 52.6937269 | 80.9225092 | 121.383764 | *P. youngi* |
| P011 | 188 | 177 | 161 | 32 | 79 | 86 | 0.17021277 | 0.44632768 | 0.53416149 | 41.4213198 | 102.258883 | 111.319797 | *P. youngi* |
| P012 | 204 | 191 | 175 | 89 | 67 | 87 | 0.43627451 | 0.35078534 | 0.49714286 | 93.3950617 | 70.308642 | 91.2962963 | *P. youngi* |
| P014 | 200 | 188 | 174 | 87 | 116 | 114 | 0.435 | 0.61702128 | 0.65517241 | 69.9842271 | 93.3123028 | 91.70347 | *P. youngi* |
| P015 | 193 | 183 | 170 | 64 | 106 | 122 | 0.33160622 | 0.57923497 | 0.71764706 | 55.890411 | 92.5684932 | 106.541096 | *P. youngi* |
| P016 | 204 | 192 | 178 | 59 | 70 | 92 | 0.28921569 | 0.36458333 | 0.51685393 | 68.0769231 | 80.7692308 | 106.153846 | *P. youngi* |
| P017 | 208 | 197 | 183 | 79 | 63 | 96 | 0.37980769 | 0.31979695 | 0.52459016 | 84.6428571 | 67.5 | 102.857143 | *P. youngi* |
| P018 | 208 | 197 | 183 | 78 | 100 | 121 | 0.375 | 0.50761421 | 0.66120219 | 66.5217391 | 85.2842809 | 103.19398 | *P. youngi* |
| P019 | 206 | 196 | 183 | 70 | 110 | 108 | 0.33980583 | 0.56122449 | 0.59016393 | 61.9791667 | 97.3958333 | 95.625 | *P. youngi* |
| P020 | 209 | 198 | 184 | 102 | 86 | 62 | 0.48803828 | 0.43434343 | 0.33695652 | 104.04 | 87.72 | 63.24 | *P. youngi* |
| P021 | 199 | 186 | 169 | 53 | 62 | 85 | 0.26633166 | 0.33333333 | 0.50295858 | 67.575 | 79.05 | 108.375 | *P. youngi* |
| P022 | 204 | 192 | 178 | 67 | 54 | 110 | 0.32843137 | 0.28125 | 0.61797753 | 73.961039 | 59.6103896 | 121.428571 | *P. profundus* |
| P031 | 200 | 187 | 172 | 58 | 75 | 80 | 0.29 | 0.40106952 | 0.46511628 | 69.4366197 | 89.7887324 | 95.7746479 | *P. youngi* |
| P032 | 204 | 193 | 179 | 73 | 120 | 122 | 0.35784314 | 0.62176166 | 0.68156425 | 59.0952381 | 97.1428571 | 98.7619048 | *P. youngi* |
| P034 | 204 | 192 | 176 | 77 | 83 | 127 | 0.37745098 | 0.43229167 | 0.72159091 | 68.4146341 | 73.7456446 | 112.839721 | *P. profundus* |
| P040 | 202 | 194 | 184 | 16 | 108 | 145 | 0.07920792 | 0.55670103 | 0.78804348 | 15.1672862 | 102.379182 | 137.453532 | *P. youngi* |
| P049 | 209 | 200 | 188 | 77 | 67 | 102 | 0.36842105 | 0.335 | 0.54255319 | 79.8170732 | 69.4512195 | 105.731707 | *P. youngi* |
| P050 | 203 | 193 | 181 | 30 | 74 | 98 | 0.14778325 | 0.38341969 | 0.54143646 | 37.8712871 | 93.4158416 | 123.712871 | *P. youngi* |
| P051 | 203 | 193 | 181 | 19 | 115 | 131 | 0.09359606 | 0.59585492 | 0.72375691 | 18.2830189 | 110.660377 | 126.056604 | *P. youngi* |
| P053 | 202 | 191 | 179 | 52 | 76 | 115 | 0.25742574 | 0.39790576 | 0.6424581 | 54.5679012 | 79.7530864 | 120.679012 | *P. youngi* |
| P054 | 204 | 194 | 182 | 53 | 57 | 100 | 0.25980392 | 0.29381443 | 0.54945055 | 64.3571429 | 69.2142857 | 121.428571 | *P. youngi* |
| P055 | 201 | 195 | 182 | 85 | 134 | 145 | 0.42288557 | 0.68717949 | 0.7967033 | 59.5467033 | 93.8736264 | 101.57967 | *P. youngi* |
| P056 | 201 | 190 | 178 | 84 | 62 | 83 | 0.41791045 | 0.32631579 | 0.46629213 | 93.5371179 | 69.0393013 | 92.4235808 | *P. profundus* |
| P057 | 202 | 193 | 182 | 72 | 46 | 76 | 0.35643564 | 0.23834197 | 0.41758242 | 94.6391753 | 60.4639175 | 99.8969072 | *P. profundus* |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P058 | 208 | 198 | 186 | 85 | 60 | 80 | 0.40865385 | 0.3030303 | 0.43010753 | 96.3333333 | 68 | 90.6666667 | *P. profundus* |
| P059 | 210 | 201 | 190 | 93 | 59 | 85 | 0.44285714 | 0.29353234 | 0.44736842 | 100.063291 | 63.4810127 | 91.4556962 | *P. profundus* |
| P060 | 212 | 202 | 192 | 86 | 56 | 85 | 0.40566038 | 0.27722772 | 0.44270833 | 96.6079295 | 62.907489 | 95.4845815 | *P. profundus* |
| P061 | 208 | 202 | 191 | 60 | 81 | 123 | 0.28846154 | 0.4009901 | 0.64397906 | 57.9545455 | 78.2386364 | 118.806818 | *P. profundus* |
| P062 | 217 | 208 | 198 | 61 | 109 | 158 | 0.28110599 | 0.52403846 | 0.7979798 | 47.4237805 | 84.7408537 | 122.835366 | *P. p. dubius* |
| P064 | 219 | 210 | 201 | 109 | 67 | 96 | 0.49771689 | 0.31904762 | 0.47761194 | 102.1875 | 62.8125 | 90 | *P. profundus* |
| P071 | 215 | 207 | 197 | 118 | 93 | 110 | 0.54883721 | 0.44927536 | 0.55837563 | 93.7383178 | 73.8785047 | 87.3831776 | *P. profundus* |
| P074 | 211 | 203 | 192 | 68 | 61 | 103 | 0.32227488 | 0.30049261 | 0.53645833 | 74.7413793 | 67.0474138 | 113.211207 | *P. profundus* |
| P075 | 207 | 202 | 192 | 87 | 86 | 117 | 0.42028986 | 0.42574257 | 0.609375 | 76.5 | 75.6206897 | 102.87931 | *P. profundus* |
| P078 | 207 | 198 | 188 | 83 | 68 | 103 | 0.40096618 | 0.34343434 | 0.54787234 | 83.3267717 | 68.2677165 | 103.405512 | *P. profundus* |
| P079 | 212 | 204 | 195 | 74 | 61 | 81 | 0.3490566 | 0.29901961 | 0.41538462 | 87.3611111 | 72.0138889 | 95.625 | *P. profundus* |
| P080 | 210 | 201 | 192 | 103 | 65 | 102 | 0.49047619 | 0.32338308 | 0.53125 | 97.2777778 | 61.3888889 | 96.3333333 | *P. profundus* |
| P081 | 202 | 193 | 178 | 85 | 69 | 87 | 0.42079208 | 0.35751295 | 0.48876404 | 89.9377593 | 73.0082988 | 92.0539419 | *P. profundus* |
| P082 | 207 | 200 | 187 | 122 | 101 | 133 | 0.58937198 | 0.505 | 0.71122995 | 87.3876404 | 72.3455056 | 95.2668539 | *P. profundus* |
| P083 | 210 | 200 | 189 | 83 | 59 | 114 | 0.3952381 | 0.295 | 0.6031746 | 82.6757813 | 58.7695313 | 113.554688 | *P. profundus* |
| P086 | 212 | 202 | 191 | 108 | 71 | 90 | 0.50943396 | 0.35148515 | 0.47120419 | 102.379182 | 67.3048327 | 85.3159851 | *P. profundus* |
| P087 | | | | | | | | | | | | | *P. profundus* |
| P088 | 194 | 185 | 173 | 98 | 74 | 117 | 0.50515464 | 0.4 | 0.67630058 | 86.4705882 | 65.2941176 | 103.235294 | *P. profundus* |
| P089 | 195 | 179 | 166 | 82 | 75 | 115 | 0.42051282 | 0.41899441 | 0.69277108 | 76.875 | 70.3125 | 107.8125 | *P. profundus* |
| P091 | 193 | 184 | 171 | 93 | 60 | 99 | 0.48186528 | 0.32608696 | 0.57894737 | 94.1071429 | 60.7142857 | 100.178571 | *P. profundus* |
| P093 | 194 | 181 | 167 | 86 | 62 | 73 | 0.44329897 | 0.34254144 | 0.43712575 | 99.2307692 | 71.5384615 | 84.2307692 | *P. profundus* |
| P094 | 198 | 188 | 175 | 83 | 47 | 81 | 0.41919192 | 0.25 | 0.46285714 | 100.308057 | 56.8009479 | 97.8909953 | *P. profundus* |
| P095 | 199 | 185 | 175 | 56 | 77 | 91 | 0.28140704 | 0.41621622 | 0.52 | 63.75 | 87.65625 | 103.59375 | *P. profundus* |
| P096 | 190 | 180 | 167 | 91 | 65 | 66 | 0.47894737 | 0.36111111 | 0.39520958 | 104.527027 | 74.6621622 | 75.8108108 | *P. profundus* |
| P097 | 190 | 176 | 149 | 59 | 81 | 114 | 0.31052632 | 0.46022727 | 0.76510067 | 59.2322835 | 81.3188976 | 114.448819 | *P. profundus* |
| P098 | 179 | 168 | 150 | 43 | 46 | 91 | 0.24022346 | 0.27380952 | 0.60666667 | 60.9166667 | 65.1666667 | 128.916667 | *P. profundus* |
| P099 | 201 | 191 | 178 | 69 | 57 | 111 | 0.34328358 | 0.29842932 | 0.62359551 | 74.2405063 | 61.3291139 | 119.43038 | *P. profundus* |
| P100 | 175 | 165 | 154 | 44 | 66 | 111 | 0.25142857 | 0.4 | 0.72077922 | 50.7692308 | 76.1538462 | 128.076923 | *P. youngi* |
| P101 | 196 | 187 | 176 | 61 | 103 | 101 | 0.31122449 | 0.55080214 | 0.57386364 | 58.6981132 | 99.1132075 | 97.1886792 | *P. youngi* |
| P102 | 193 | 183 | 172 | 8 | 133 | 159 | 0.04145078 | 0.72677596 | 0.9244186 | 6.8 | 113.05 | 135.15 | *P. youngi* |
| P103 | 185 | 172 | 157 | 69 | 96 | 96 | 0.37297297 | 0.55813953 | 0.61146497 | 67.4137931 | 93.7931034 | 93.7931034 | *P. youngi* |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P104 | 191 | 180 | 167 | 34 | 125 | 149 | 0.17801047 | 0.69444444 | 0.89221557 | 28.1493506 | 103.49026 | 123.36039 | *P. youngi* |
| P105 | 191 | 180 | 168 | 38 | 76 | 84 | 0.19895288 | 0.42222222 | 0.5 | 48.9393939 | 97.8787879 | 108.181818 | *P. youngi* |
| P114 | 185 | 173 | 161 | 39 | 64 | 82 | 0.21081081 | 0.3699422 | 0.50931677 | 53.7567568 | 88.2162162 | 113.027027 | *P. profundus* |
| P116 | 185 | 174 | 162 | 64 | 45 | 68 | 0.34594595 | 0.25862069 | 0.41975309 | 92.2033898 | 64.8305085 | 97.9661017 | *P. profundus* |
| P119 | 183 | 172 | 156 | 53 | 72 | 139 | 0.28961749 | 0.41860465 | 0.89102564 | 51.1931818 | 69.5454545 | 134.261364 | *P. profundus* |
| P121 | 194 | 183 | 171 | 72 | 55 | 78 | 0.37113402 | 0.30054645 | 0.45614035 | 89.5609756 | 68.4146341 | 97.0243902 | *P. profundus* |
| P122 | 185 | 175 | 163 | 99 | 79 | 118 | 0.53513514 | 0.45142857 | 0.72392638 | 85.2871622 | 68.0574324 | 101.655405 | *P. profundus* |
| P123 | | | | | | | | | | | | | *P. profundus* |
| P125 | 179 | 171 | 157 | 64 | 51 | 78 | 0.3575419 | 0.29824561 | 0.49681529 | 84.5595855 | 67.3834197 | 103.056995 | *P. profundus* |
| P127 | 178 | 167 | 155 | 49 | 87 | 111 | 0.2752809 | 0.52095808 | 0.71612903 | 50.5870445 | 89.8178138 | 114.595142 | *P. profundus* |
| P128 | 180 | 172 | 158 | 33 | 61 | 89 | 0.18333333 | 0.35465116 | 0.56329114 | 45.9836066 | 85 | 124.016393 | *P. profundus* |
| P129 | | | | | | | | | | | | | *P. profundus* |
| P130 | 199 | 187 | 175 | 108 | 96 | 134 | 0.54271357 | 0.51336898 | 0.76571429 | 81.4792899 | 72.4260355 | 101.094675 | *P. profundus* |
| P134 | 182 | 171 | 158 | 95 | 73 | 122 | 0.52197802 | 0.42690058 | 0.7721519 | 83.5344828 | 64.1896552 | 107.275862 | *P. profundus* |
| P135 | 194 | 184 | 173 | 46 | 116 | 147 | 0.2371134 | 0.63043478 | 0.84971098 | 37.961165 | 95.7281553 | 121.31068 | *P. profundus* |
| P136 | 195 | 186 | 174 | 102 | 161 | 183 | 0.52307692 | 0.8655914 | 1.05172414 | 58.3183857 | 92.0515695 | 104.630045 | *P. profundus* |
| P137 | 201 | 192 | 179 | 9 | 101 | 160 | 0.04477612 | 0.52604167 | 0.89385475 | 8.5 | 95.3888889 | 151.111111 | *P. profundus* |
| P138 | 199 | 188 | 176 | 65 | 102 | 155 | 0.32663317 | 0.54255319 | 0.88068182 | 51.4751553 | 80.7763975 | 122.748447 | *P. profundus* |
| P139 | 210 | 200 | 186 | 77 | 64 | 97 | 0.36666667 | 0.32 | 0.52150538 | 82.5 | 68.5714286 | 103.928571 | *P. profundus* |
| P140 | 200 | 189 | 177 | 59 | 131 | 171 | 0.295 | 0.69312169 | 0.96610169 | 41.6759003 | 92.534626 | 120.789474 | *P. profundus* |
| P141 | 201 | 189 | 174 | 68 | 99 | 122 | 0.33830846 | 0.52380952 | 0.70114943 | 60 | 87.3529412 | 107.647059 | *P. profundus* |
| P143 | 214 | 207 | 198 | 75 | 69 | 123 | 0.35046729 | 0.33333333 | 0.62121212 | 71.6292135 | 65.8988764 | 117.47191 | *P. profundus* |
| P144 | 199 | 188 | 175 | 55 | 52 | 104 | 0.27638191 | 0.27659574 | 0.59428571 | 66.4691943 | 62.8436019 | 125.687204 | *P. profundus* |
| P145 | 203 | 196 | 184 | 77 | 65 | 113 | 0.37931034 | 0.33163265 | 0.61413043 | 77 | 65 | 113 | *P. profundus* |
| P147 | 205 | 194 | 182 | 72 | 111 | 116 | 0.35121951 | 0.57216495 | 0.63736264 | 61.4046823 | 94.6655518 | 98.9297659 | *P. youngi* |
| P149 | 209 | 203 | 194 | 74 | 59 | 107 | 0.35406699 | 0.29064039 | 0.55154639 | 78.625 | 62.6875 | 113.6875 | *P. profundus* |
| P152 | 207 | 201 | 191 | 86 | 121 | 155 | 0.41545894 | 0.60199005 | 0.81151832 | 60.5801105 | 85.2348066 | 109.185083 | *P. profundus* |
| P154 | 180 | 169 | 156 | 39 | 31 | 87 | 0.21666667 | 0.18343195 | 0.55769231 | 63.343949 | 50.3503185 | 141.305732 | *P. profundus* |
| P155 | 185 | 174 | 161 | 58 | 44 | 72 | 0.31351351 | 0.25287356 | 0.44720497 | 85 | 64.4827586 | 105.517241 | *P. profundus* |
| P026 | 173 | 166 | 154 | 45 | 41 | 73 | 0.26011561 | 0.24698795 | 0.47402597 | 72.1698113 | 65.754717 | 117.075472 | *P. profundus* |
| P025 | 205 | 199 | 187 | 129 | 122 | 169 | 0.62926829 | 0.61306533 | 0.90374332 | 78.3214286 | 74.0714286 | 102.607143 | *P. profundus* |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P159 | 181 | 173 | 163 | 70 | 72 | 114 | 0.38674033 | 0.41618497 | 0.6993865 | 69.7265625 | 71.71875 | 113.554688 | *P. profundus* |
| P107 | 185 | 174 | 161 | 71 | 59 | 74 | 0.38378378 | 0.33908046 | 0.45962733 | 88.75 | 73.75 | 92.5 | *P. p. dubius* |
| P157 | 172 | 163 | 148 | 51 | 60 | 110 | 0.29651163 | 0.36809816 | 0.74324324 | 58.8461538 | 69.2307692 | 126.923077 | P. profundus |
| P005 | 175 | 168 | 155 | 39 | 54 | 101 | 0.22285714 | 0.32142857 | 0.6516129 | 51.2628866 | 70.9793814 | 132.757732 | *P. profundus* |
| P004 | 180 | 170 | 156 | 57 | 39 | 67 | 0.31666667 | 0.22941176 | 0.42948718 | 89.1717791 | 61.0122699 | 104.815951 | *P. profundus* |
| P166 | 181 | 171 | 156 | 55 | 36 | 66 | 0.3038674 | 0.21052632 | 0.42307692 | 89.3312102 | 58.4713376 | 107.197452 | |
| P167 | 183 | 172 | 159 | 59 | 50 | 77 | 0.32240437 | 0.29069767 | 0.48427673 | 80.8870968 | 68.5483871 | 105.564516 | |
| P027 | 177 | 169 | 156 | 73 | 72 | 130 | 0.41242938 | 0.4260355 | 0.83333333 | 67.6909091 | 66.7636364 | 120.545455 | P. profundus |
| P148 | 210 | 204 | 192 | 48 | 35 | 85 | 0.22857143 | 0.17156863 | 0.44270833 | 72.8571429 | 53.125 | 129.017857 | *P. profundus* |
| P158 | 203 | 195 | 183 | 100 | 112 | 119 | 0.49261084 | 0.57435897 | 0.65027322 | 77.0392749 | 86.2839879 | 91.6767372 | P. youngi |
| | | | | | | | | | | | | | |

| | Grey- Edge Elytrum | | | Sample - Edge Elytrum | | | Corrected RGB - Edge Elytrum | | | Standardized - RGB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample | R | G | B | R | G | B | R | G | B | R | G | B |
| P120 | 211 | 203 | 192 | 79 | 66 | 91 | 0.37440758 | 0.32512315 | 0.47395833 | 85.3601695 | 71.3135593 | 98.3262712 |
| P142 | 202 | 193 | 181 | 133 | 175 | 142 | 0.65841584 | 0.90673575 | 0.78453039 | 75.3666667 | 99.1666667 | 80.4666667 |
| P002 | 201 | 190 | 178 | 67 | 158 | 154 | 0.33333333 | 0.83157895 | 0.86516854 | 45.0791557 | 106.306069 | 103.614776 |
| P008 | 202 | 192 | 181 | 64 | 86 | 118 | 0.31683168 | 0.44791667 | 0.6519337 | 60.8955224 | 81.8283582 | 112.276119 |
| P009 | 179 | 165 | 144 | 69 | 155 | 152 | 0.38547486 | 0.93939394 | 1.05555556 | 46.7952128 | 105.119681 | 103.085106 |
| P010 | 194 | 183 | 169 | 103 | 71 | 89 | 0.53092784 | 0.38797814 | 0.52662722 | 99.8669202 | 68.8403042 | 86.2927757 |
| P011 | 188 | 177 | 161 | 68 | 94 | 88 | 0.36170213 | 0.53107345 | 0.54658385 | 69.36 | 95.88 | 89.76 |
| P012 | 204 | 191 | 175 | 121 | 78 | 98 | 0.59313725 | 0.40837696 | 0.56 | 103.888889 | 66.969697 | 84.1414141 |
| P014 | 200 | 188 | 174 | 133 | 86 | 71 | 0.665 | 0.45744681 | 0.40804598 | 116.948276 | 75.6206897 | 62.4310345 |
| P015 | 193 | 183 | 170 | 119 | 172 | 165 | 0.61658031 | 0.93989071 | 0.97058824 | 66.5460526 | 96.1842105 | 92.2697368 |
| P016 | 204 | 192 | 178 | 133 | 76 | 81 | 0.65196078 | 0.39583333 | 0.45505618 | 116.948276 | 66.8275862 | 71.2241379 |
| P017 | 208 | 197 | 183 | 111 | 151 | 179 | 0.53365385 | 0.76649746 | 0.97814208 | 64.1836735 | 87.3129252 | 103.503401 |
| P018 | 208 | 197 | 183 | 98 | 161 | 185 | 0.47115385 | 0.81725888 | 1.01092896 | 56.2837838 | 92.4662162 | 106.25 |
| P019 | 206 | 196 | 183 | 147 | 191 | 164 | 0.71359223 | 0.9744898 | 0.89617486 | 74.6713147 | 97.0219124 | 83.3067729 |
| P020 | 209 | 198 | 184 | 142 | 74 | 61 | 0.67942584 | 0.37373737 | 0.33152174 | 130.722022 | 68.1227437 | 56.1552347 |
| P021 | 199 | 186 | 169 | 55 | 88 | 95 | 0.27638191 | 0.47311828 | 0.56213018 | 58.9285714 | 94.2857143 | 101.785714 |
| P022 | 204 | 192 | 178 | 70 | 146 | 216 | 0.34313725 | 0.76041667 | 1.21348315 | 41.3194444 | 86.1805556 | 127.5 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P031 | 200 | 187 | 172 | 86 | 116 | 104 | 0.43 | 0.62032086 | 0.60465116 | 71.6666667 | 96.6666667 | 86.6666667 |
| P032 | 204 | 193 | 179 | 129 | 160 | 152 | 0.63235294 | 0.82901554 | 0.84916201 | 74.5918367 | 92.5170068 | 87.8911565 |
| P034 | 204 | 192 | 176 | 127 | 106 | 125 | 0.62254902 | 0.55208333 | 0.71022727 | 90.4608939 | 75.5027933 | 89.0363128 |
| P040 | 202 | 194 | 184 | 70 | 192 | 193 | 0.34653465 | 0.98969072 | 1.04891304 | 39.2307692 | 107.604396 | 108.164835 |
| P049 | 209 | 200 | 188 | 43 | 110 | 126 | 0.20574163 | 0.55 | 0.67021277 | 39.3010753 | 100.537634 | 115.16129 |
| P050 | 203 | 193 | 181 | 107 | 174 | 168 | 0.5270936 | 0.9015544 | 0.9281768 | 60.7683742 | 98.8195991 | 95.4120267 |
| P051 | 203 | 193 | 181 | 96 | 191 | 178 | 0.4729064 | 0.98963731 | 0.98342541 | 52.6451613 | 104.741935 | 97.6129032 |
| P053 | 202 | 191 | 179 | 70 | 149 | 145 | 0.34653465 | 0.78010471 | 0.81005587 | 49.0384615 | 104.381868 | 101.57967 |
| P054 | 204 | 194 | 182 | 99 | 60 | 80 | 0.48529412 | 0.30927835 | 0.43956044 | 105.627615 | 64.0167364 | 85.3556485 |
| P055 | 201 | 195 | 182 | 138 | 191 | 164 | 0.68656716 | 0.97948718 | 0.9010989 | 71.3793103 | 98.7931034 | 84.8275862 |
| P056 | 201 | 190 | 178 | 125 | 62 | 89 | 0.62189055 | 0.32631579 | 0.5 | 115.48913 | 57.2826087 | 82.2282609 |
| P057 | 202 | 193 | 182 | 78 | 101 | 132 | 0.38613861 | 0.52331606 | 0.72527473 | 63.9549839 | 82.8135048 | 108.231511 |
| P058 | 208 | 198 | 186 | 112 | 68 | 95 | 0.53846154 | 0.34343434 | 0.51075269 | 103.854545 | 63.0545455 | 88.0909091 |
| P059 | 210 | 201 | 190 | 120 | 128 | 170 | 0.57142857 | 0.63681592 | 0.89473684 | 73.2057416 | 78.0861244 | 103.708134 |
| P060 | 212 | 202 | 192 | 90 | 67 | 80 | 0.4245283 | 0.33168317 | 0.41666667 | 96.835443 | 72.0886076 | 86.0759494 |
| P061 | 208 | 202 | 191 | 136 | 108 | 124 | 0.65384615 | 0.53465347 | 0.64921466 | 94.2391304 | 74.8369565 | 85.923913 |
| P062 | 217 | 208 | 198 | 147 | 99 | 121 | 0.67741935 | 0.47596154 | 0.61111111 | 102.138965 | 68.7874659 | 84.0735695 |
| P064 | 219 | 210 | 201 | 108 | 129 | 193 | 0.49315068 | 0.61428571 | 0.960199 | 64.0465116 | 76.5 | 114.453488 |
| P071 | 215 | 207 | 197 | 184 | 115 | 123 | 0.85581395 | 0.55555556 | 0.62436548 | 111.184834 | 69.4905213 | 74.3246445 |
| P074 | 211 | 203 | 192 | 108 | 81 | 122 | 0.51184834 | 0.39901478 | 0.63541667 | 88.5530547 | 66.414791 | 100.032154 |
| P075 | 207 | 202 | 192 | 125 | 71 | 73 | 0.60386473 | 0.35148515 | 0.38020833 | 118.494424 | 67.3048327 | 69.2007435 |
| P078 | 207 | 198 | 188 | 92 | 123 | 185 | 0.44444444 | 0.62121212 | 0.98404255 | 58.65 | 78.4125 | 117.9375 |
| P079 | 212 | 204 | 195 | 127 | 177 | 191 | 0.5990566 | 0.86764706 | 0.97948718 | 65.4242424 | 91.1818182 | 98.3939394 |
| P080 | 210 | 201 | 192 | 88 | 143 | 201 | 0.41904762 | 0.71144279 | 1.046875 | 51.9444444 | 84.4097222 | 118.645833 |
| P081 | 202 | 193 | 178 | 116 | 80 | 107 | 0.57425743 | 0.41450777 | 0.6011236 | 97.6237624 | 67.3267327 | 90.049505 |
| P082 | 207 | 200 | 187 | 104 | 142 | 211 | 0.50241546 | 0.71 | 1.12834225 | 58.0306346 | 79.2341357 | 117.73523 |
| P083 | 210 | 200 | 189 | 133 | 145 | 185 | 0.63333333 | 0.725 | 0.97883598 | 73.25054 | 79.8596112 | 101.889849 |
| P086 | 212 | 202 | 191 | 177 | 134 | 176 | 0.83490566 | 0.66336634 | 0.92146597 | 92.6796715 | 70.164271 | 92.1560575 |
| P087 | | | | | | | | | | | | |
| P088 | 194 | 185 | 173 | 84 | 99 | 181 | 0.43298969 | 0.53513514 | 1.04624277 | 58.8461538 | 69.3543956 | 126.799451 |
| P089 | 195 | 179 | 166 | 101 | 93 | 162 | 0.51794872 | 0.51955307 | 0.97590361 | 72.3455056 | 66.6151685 | 116.039326 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P091 | 193 | 184 | 171 | 126 | 84 | 135 | 0.65284974 | 0.45652174 | 0.78947368 | 93.1304348 | 62.0869565 | 99.7826087 |
| P093 | 194 | 181 | 167 | 106 | 69 | 125 | 0.54639175 | 0.38121547 | 0.74850299 | 90.1 | 58.65 | 106.25 |
| P094 | 198 | 188 | 175 | 53 | 117 | 140 | 0.26767677 | 0.62234043 | 0.8 | 43.5967742 | 96.2419355 | 115.16129 |
| P095 | 199 | 185 | 175 | 66 | 133 | 171 | 0.33165829 | 0.71891892 | 0.97714286 | 45.4864865 | 91.6621622 | 117.851351 |
| P096 | 190 | 180 | 167 | 106 | 78 | 108 | 0.55789474 | 0.43333333 | 0.64670659 | 92.5684932 | 68.1164384 | 94.3150685 |
| P097 | 190 | 176 | 149 | 59 | 81 | 114 | 0.31052632 | 0.46022727 | 0.76510067 | 59.2322835 | 81.3188976 | 114.448819 |
| P098 | 179 | 168 | 150 | 57 | 84 | 133 | 0.31843575 | 0.5 | 0.88666667 | 53.0474453 | 78.1751825 | 123.777372 |
| P099 | 201 | 191 | 178 | 100 | 118 | 180 | 0.49751244 | 0.61780105 | 1.01123596 | 64.0703518 | 75.6030151 | 115.326633 |
| P100 | 175 | 165 | 154 | 18 | 136 | 165 | 0.10285714 | 0.82424242 | 1.07142857 | 14.3887147 | 108.714734 | 131.896552 |
| P101 | 196 | 187 | 176 | 81 | 158 | 139 | 0.41326531 | 0.84491979 | 0.78977273 | 54.6428571 | 106.587302 | 93.7698413 |
| P102 | 193 | 183 | 172 | 81 | 165 | 152 | 0.41968912 | 0.90163934 | 0.88372093 | 51.8969849 | 105.71608 | 97.3869347 |
| P103 | 185 | 172 | 157 | 64 | 103 | 91 | 0.34594595 | 0.59883721 | 0.57961783 | 63.255814 | 101.802326 | 89.9418605 |
| P104 | 191 | 180 | 167 | 53 | 100 | 104 | 0.27748691 | 0.55555556 | 0.62275449 | 52.5875486 | 99.2217899 | 103.190661 |
| P105 | 191 | 180 | 168 | 57 | 112 | 124 | 0.29842932 | 0.62222222 | 0.73809524 | 49.6075085 | 97.4744027 | 107.918089 |
| P114 | 185 | 173 | 161 | 68 | 84 | 85 | 0.36756757 | 0.48554913 | 0.52795031 | 73.164557 | 90.3797468 | 91.4556962 |
| P116 | 185 | 174 | 162 | 80 | 42 | 57 | 0.43243243 | 0.24137931 | 0.35185185 | 113.96648 | 59.8324022 | 81.2011173 |
| P119 | 183 | 172 | 156 | 111 | 78 | 97 | 0.60655738 | 0.45348837 | 0.62179487 | 98.9685315 | 69.5454545 | 86.486014 |
| P121 | 194 | 183 | 171 | 111 | 152 | 153 | 0.57216495 | 0.83060109 | 0.89473684 | 68.0408654 | 93.1730769 | 93.7860577 |
| P122 | 185 | 175 | 163 | 104 | 81 | 117 | 0.56216216 | 0.46285714 | 0.71779141 | 87.8145695 | 68.3940397 | 98.7913907 |
| P123 | | | | | | | | | | | | |
| P124 | 179 | 170 | 157 | 74 | 103 | 143 | 0.41340782 | 0.60588235 | 0.91082803 | 58.96875 | 82.078125 | 113.953125 |
| P125 | 179 | 171 | 157 | 72 | 104 | 144 | 0.40223464 | 0.60818713 | 0.91719745 | 57.375 | 82.875 | 114.75 |
| P127 | 178 | 167 | 155 | 109 | 156 | 146 | 0.61235955 | 0.93413174 | 0.94193548 | 67.6277372 | 96.7883212 | 90.5839416 |
| P128 | 180 | 172 | 158 | 90 | 122 | 120 | 0.5 | 0.70930233 | 0.75949367 | 69.126506 | 93.7048193 | 92.1686747 |
| P129 | 197 | 187 | 175 | 74 | 126 | 144 | 0.37563452 | 0.67379679 | 0.82285714 | 54.8546512 | 93.4011628 | 106.744186 |
| P130 | 199 | 187 | 175 | 123 | 140 | 178 | 0.61809045 | 0.7486631 | 1.01714286 | 71.122449 | 80.952381 | 102.92517 |
| P134 | 182 | 171 | 158 | 118 | 84 | 128 | 0.64835165 | 0.49122807 | 0.81012658 | 91.1818182 | 64.9090909 | 98.9090909 |
| P135 | 194 | 184 | 173 | 114 | 167 | 182 | 0.58762887 | 0.9076087 | 1.05202312 | 62.7861771 | 91.9762419 | 100.237581 |
| P136 | 195 | 186 | 174 | 112 | 181 | 195 | 0.57435897 | 0.97311828 | 1.12068966 | 58.5245902 | 94.579918 | 101.895492 |
| P137 | 201 | 192 | 179 | 9 | 142 | 167 | 0.04477612 | 0.73958333 | 0.93296089 | 7.21698113 | 113.867925 | 133.915094 |
| P138 | 199 | 188 | 176 | 44 | 117 | 158 | 0.22110553 | 0.62234043 | 0.89772727 | 35.1724138 | 93.5266458 | 126.30094 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P139 | 210 | 200 | 186 | 88 | 143 | 173 | 0.41904762 | 0.715 | 0.93010753 | 55.5445545 | 90.259901 | 109.195545 |
| P140 | 200 | 189 | 177 | 81 | 163 | 165 | 0.405 | 0.86243386 | 0.93220339 | 50.5012225 | 101.625917 | 102.872861 |
| P141 | 201 | 189 | 174 | 101 | 87 | 101 | 0.50248756 | 0.46031746 | 0.58045977 | 89.1176471 | 76.7647059 | 89.1176471 |
| P143 | 214 | 207 | 198 | 111 | 133 | 173 | 0.51869159 | 0.64251208 | 0.87373737 | 67.8776978 | 81.3309353 | 105.791367 |
| P144 | 199 | 188 | 175 | 47 | 106 | 141 | 0.2361809 | 0.56382979 | 0.80571429 | 40.7653061 | 91.9387755 | 122.295918 |
| P145 | 203 | 196 | 184 | 103 | 99 | 149 | 0.50738916 | 0.50510204 | 0.80978261 | 74.8290598 | 71.9230769 | 108.247863 |
| P147 | 205 | 194 | 182 | 99 | 154 | 149 | 0.48292683 | 0.79381443 | 0.81868132 | 62.7985075 | 97.6865672 | 94.5149254 |
| P149 | 209 | 203 | 194 | 99 | 108 | 191 | 0.47368421 | 0.5320197 | 0.98453608 | 63.4296482 | 69.1959799 | 122.374372 |
| P152 | 207 | 201 | 191 | 114 | 142 | 170 | 0.55072464 | 0.70646766 | 0.89005236 | 68.2394366 | 85 | 101.760563 |
| P154 | 180 | 169 | 156 | 30 | 68 | 117 | 0.16666667 | 0.40236686 | 0.75 | 35.5813953 | 80.6511628 | 138.767442 |
| P155 | 185 | 174 | 161 | 97 | 55 | 78 | 0.52432432 | 0.31609195 | 0.48447205 | 107.543478 | 60.9782609 | 86.4782609 |
| P026 | 173 | 166 | 154 | 75 | 100 | 147 | 0.43352601 | 0.60240964 | 0.95454545 | 59.3944099 | 79.1925466 | 116.413043 |
| P025 | 205 | 199 | 187 | 127 | 150 | 189 | 0.6195122 | 0.75376884 | 1.01069519 | 69.4957082 | 82.0815451 | 103.422747 |
| P159 | 181 | 173 | 163 | 112 | 82 | 109 | 0.61878453 | 0.47398844 | 0.66871166 | 94.2574257 | 69.009901 | 91.7326733 |
| P107 | 185 | 174 | 161 | 105 | 84 | 96 | 0.56756757 | 0.48275862 | 0.59627329 | 93.9473684 | 75.1578947 | 85.8947368 |
| P157 | 172 | 163 | 148 | 91 | 127 | 151 | 0.52906977 | 0.7791411 | 1.02027027 | 62.8861789 | 87.7642276 | 104.349593 |
| P005 | 175 | 168 | 155 | 53 | 91 | 123 | 0.30285714 | 0.54166667 | 0.79354839 | 50.6179775 | 86.9101124 | 117.47191 |
| P004 | 180 | 170 | 156 | 79 | 98 | 158 | 0.43888889 | 0.57647059 | 1.01282051 | 60.1343284 | 74.5970149 | 120.268657 |
| P166 | 181 | 171 | 156 | 46 | 56 | 107 | 0.25414365 | 0.32748538 | 0.68589744 | 56.1244019 | 68.3253589 | 130.550239 |
| P167 | 183 | 172 | 159 | 99 | 75 | 102 | 0.54098361 | 0.43604651 | 0.64150943 | 91.4673913 | 69.2934783 | 94.2391304 |
| P027 | 177 | 169 | 156 | 117 | 95 | 127 | 0.66101695 | 0.56213018 | 0.81410256 | 88.0088496 | 71.460177 | 95.5309735 |
| P148 | 210 | 204 | 192 | 106 | 94 | 177 | 0.5047619 | 0.46078431 | 0.921875 | 71.6976127 | 63.5809019 | 119.721485 |
| P158 | 203 | 195 | 183 | 121 | 143 | 153 | 0.59605911 | 0.73333333 | 0.83606557 | 73.9928058 | 87.4460432 | 93.5611511 |

| | Grey - Anterior | | | Sample - Anterior | | | Corrected RGB - Anterior | | | Standardized RGB - Anterior | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample | R | G | B | R | G | B | R | G | B | R | G | B |
| P120 | 211 | 203 | 192 | 132 | 111 | 143 | 0.62559242 | 0.54679803 | 0.74479167 | 87.2020725 | 73.3290155 | 94.4689119 |
| P142 | 202 | 193 | 181 | 142 | 168 | 160 | 0.7029703 | 0.87046632 | 0.8839779 | 77.0425532 | 91.1489362 | 86.8085106 |
| P002 | 201 | 190 | 178 | 60 | 124 | 140 | 0.29850746 | 0.65263158 | 0.78651685 | 47.2222222 | 97.5925926 | 110.185185 |
| P008 | 202 | 192 | 181 | 86 | 110 | 137 | 0.42574257 | 0.57291667 | 0.75690608 | 65.8558559 | 84.2342342 | 104.90991 |
| P009 | 179 | 165 | 144 | 51 | 119 | 110 | 0.2849162 | 0.72121212 | 0.76388889 | 46.4464286 | 108.375 | 100.178571 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P010 | 194 | 183 | 169 | 97 | 126 | 135 | 0.5 | 0.68852459 | 0.79881657 | 69.0921788 | 89.7486034 | 96.1592179 |
| P011 | 188 | 177 | 161 | 91 | 123 | 135 | 0.48404255 | 0.69491525 | 0.83850932 | 66.4899713 | 89.8710602 | 98.6389685 |
| P012 | 204 | 191 | 175 | 101 | 104 | 132 | 0.49509804 | 0.54450262 | 0.75428571 | 76.4243323 | 78.694362 | 99.8813056 |
| P014 | 200 | 188 | 174 | 74 | 108 | 115 | 0.37 | 0.57446809 | 0.66091954 | 63.5353535 | 92.7272727 | 98.7373737 |
| P015 | 193 | 183 | 170 | 103 | 156 | 160 | 0.53367876 | 0.85245902 | 0.94117647 | 62.6849642 | 94.9403341 | 97.3747017 |
| P016 | 204 | 192 | 178 | 90 | 146 | 147 | 0.44117647 | 0.76041667 | 0.8258427 | 59.921671 | 97.2062663 | 97.8720627 |
| P017 | 208 | 197 | 183 | 119 | 143 | 176 | 0.57211538 | 0.72588832 | 0.96174863 | 69.2808219 | 83.2534247 | 102.465753 |
| P018 | 208 | 197 | 183 | 85 | 128 | 161 | 0.40865385 | 0.64974619 | 0.87978142 | 57.9545455 | 87.2727273 | 109.772727 |
| P019 | 206 | 196 | 183 | 157 | 205 | 193 | 0.76213592 | 1.04591837 | 1.05464481 | 72.1351351 | 94.1891892 | 88.6756757 |
| P020 | 209 | 198 | 184 | 100 | 93 | 98 | 0.4784689 | 0.46969697 | 0.5326087 | 87.628866 | 81.4948454 | 85.8762887 |
| P021 | 199 | 186 | 169 | 87 | 134 | 133 | 0.43718593 | 0.72043011 | 0.78698225 | 62.6694915 | 96.5254237 | 95.8050847 |
| P022 | 204 | 192 | 178 | 95 | 89 | 122 | 0.46568627 | 0.46354167 | 0.68539326 | 79.1666667 | 74.1666667 | 101.666667 |
| P031 | 200 | 187 | 172 | 87 | 110 | 114 | 0.435 | 0.58823529 | 0.6627907 | 71.3344051 | 90.192926 | 93.4726688 |
| P032 | 204 | 193 | 179 | 76 | 122 | 120 | 0.37254902 | 0.63212435 | 0.67039106 | 60.9433962 | 97.8301887 | 96.2264151 |
| P034 | 204 | 192 | 176 | 126 | 105 | 122 | 0.61764706 | 0.546875 | 0.69318182 | 91.01983 | 75.8498584 | 88.1303116 |
| P040 | 202 | 194 | 184 | 107 | 157 | 164 | 0.52970297 | 0.80927835 | 0.89130435 | 63.75 | 93.5397196 | 97.7102804 |
| P049 | 209 | 200 | 188 | 130 | 165 | 157 | 0.62200957 | 0.825 | 0.83510638 | 73.340708 | 93.0862832 | 88.5730088 |
| P050 | 203 | 193 | 181 | 58 | 99 | 117 | 0.28571429 | 0.51295337 | 0.64640884 | 53.9781022 | 92.1350365 | 108.886861 |
| P051 | 203 | 193 | 181 | 103 | 181 | 185 | 0.50738916 | 0.93782383 | 1.02209945 | 56.0021322 | 98.4115139 | 100.586354 |
| P053 | 202 | 191 | 179 | 117 | 176 | 183 | 0.57920792 | 0.92146597 | 1.02234637 | 62.6785714 | 94.2857143 | 98.0357143 |
| P054 | 204 | 194 | 182 | 74 | 126 | 149 | 0.3627451 | 0.64948454 | 0.81868132 | 54.0687679 | 92.0630372 | 108.868195 |
| P055 | 201 | 195 | 182 | 100 | 126 | 141 | 0.49751244 | 0.64615385 | 0.77472527 | 69.4822888 | 87.5476839 | 97.9700272 |
| P056 | 201 | 190 | 178 | 95 | 101 | 132 | 0.47263682 | 0.53157895 | 0.74157303 | 73.8567073 | 78.5213415 | 102.621951 |
| P057 | 202 | 193 | 182 | 100 | 89 | 109 | 0.4950495 | 0.4611399 | 0.5989011 | 85.5704698 | 76.1577181 | 93.2718121 |
| P058 | 208 | 198 | 186 | 112 | 93 | 119 | 0.53846154 | 0.46969697 | 0.63978495 | 88.1481481 | 73.1944444 | 93.6574074 |
| P059 | 210 | 201 | 190 | 121 | 97 | 128 | 0.57619048 | 0.48258706 | 0.67368421 | 89.1763006 | 71.4884393 | 94.3352601 |
| P060 | 212 | 202 | 192 | 147 | 120 | 137 | 0.69339623 | 0.59405941 | 0.71354167 | 92.7846535 | 75.7425743 | 86.4727723 |
| P061 | 208 | 202 | 191 | 96 | 99 | 112 | 0.46153846 | 0.49009901 | 0.58638743 | 79.7394137 | 82.2312704 | 93.029316 |
| P062 | 217 | 208 | 198 | 110 | 176 | 183 | 0.50691244 | 0.84615385 | 0.92424242 | 59.8081023 | 95.6929638 | 99.4989339 |
| P064 | 219 | 210 | 201 | 129 | 117 | 178 | 0.5890411 | 0.55714286 | 0.88557214 | 77.5825472 | 70.365566 | 107.051887 |
| P071 | 215 | 207 | 197 | 120 | 102 | 118 | 0.55813953 | 0.49275362 | 0.59898477 | 90 | 76.5 | 88.5 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P074 | 211 | 203 | 192 | 152 | 155 | 201 | 0.72037915 | 0.7635468 | 1.046875 | 76.2992126 | 77.8051181 | 100.895669 |
| P075 | 207 | 202 | 192 | 114 | 107 | 120 | 0.55072464 | 0.52970297 | 0.625 | 85.2492669 | 80.0146628 | 89.7360704 |
| P078 | 207 | 198 | 188 | 129 | 106 | 119 | 0.62318841 | 0.53535354 | 0.63297872 | 92.9237288 | 76.3559322 | 85.720339 |
| P079 | 212 | 204 | 195 | 128 | 107 | 132 | 0.60377358 | 0.5245098 | 0.67692308 | 88.9373297 | 74.346049 | 91.7166213 |
| P080 | 210 | 201 | 192 | 151 | 97 | 157 | 0.71904762 | 0.48258706 | 0.81770833 | 95.0740741 | 61.0740741 | 98.8518519 |
| P081 | 202 | 193 | 178 | 138 | 117 | 142 | 0.68316832 | 0.60621762 | 0.79775281 | 88.6397985 | 75.1511335 | 91.209068 |
| P082 | 207 | 200 | 187 | 144 | 122 | 149 | 0.69565217 | 0.61 | 0.79679144 | 88.4819277 | 74.9638554 | 91.5542169 |
| P083 | 210 | 200 | 189 | 77 | 55 | 98 | 0.36666667 | 0.275 | 0.51851852 | 85.3695652 | 60.9782609 | 108.652174 |
| P086 | 212 | 202 | 191 | 146 | 117 | 159 | 0.68867925 | 0.57920792 | 0.83246073 | 88.2227488 | 70.6990521 | 96.0781991 |
| P087 | | | | | | | | | | | | |
| P088 | 194 | 185 | 173 | 132 | 96 | 121 | 0.68041237 | 0.51891892 | 0.69942197 | 96.4469914 | 70.1432665 | 88.4097421 |
| P089 | 195 | 179 | 166 | 88 | 74 | 111 | 0.45128205 | 0.41340782 | 0.6686747 | 82.1978022 | 69.1208791 | 103.681319 |
| P091 | 193 | 184 | 171 | 115 | 85 | 105 | 0.59585492 | 0.46195652 | 0.61403509 | 96.147541 | 71.0655738 | 87.7868852 |
| P093 | 194 | 181 | 167 | 139 | 107 | 125 | 0.71649485 | 0.59116022 | 0.74850299 | 95.5390836 | 73.5444744 | 85.916442 |
| P094 | 198 | 188 | 175 | 115 | 94 | 146 | 0.58080808 | 0.5 | 0.83428571 | 82.6056338 | 67.5211268 | 104.873239 |
| P095 | 199 | 185 | 175 | 112 | 100 | 132 | 0.56281407 | 0.54054054 | 0.75428571 | 83.0232558 | 74.127907 | 97.8488372 |
| P096 | 190 | 180 | 167 | 135 | 104 | 117 | 0.71052632 | 0.57777778 | 0.7005988 | 96.6994382 | 74.494382 | 83.8061798 |
| P097 | 190 | 176 | 149 | 112 | 97 | 150 | 0.58947368 | 0.55113636 | 1.00671141 | 79.5543175 | 68.8997214 | 106.545961 |
| P098 | 179 | 168 | 150 | 163 | 140 | 182 | 0.91061453 | 0.83333333 | 1.21333333 | 85.7010309 | 73.6082474 | 95.6907216 |
| P100 | 175 | 165 | 154 | 107 | 142 | 165 | 0.61142857 | 0.86060606 | 1.07142857 | 65.9057971 | 87.4637681 | 101.630435 |
| P101 | 196 | 187 | 176 | 133 | 191 | 175 | 0.67857143 | 1.02139037 | 0.99431818 | 67.9659319 | 97.6052104 | 89.4288577 |
| P102 | 193 | 183 | 172 | 26 | 118 | 125 | 0.13471503 | 0.64480874 | 0.72674419 | 24.6468401 | 111.858736 | 118.494424 |
| P103 | 185 | 172 | 157 | 66 | 117 | 126 | 0.35675676 | 0.68023256 | 0.80254777 | 54.4660194 | 96.5533981 | 103.980583 |
| P104 | 191 | 180 | 167 | 78 | 148 | 168 | 0.40837696 | 0.82222222 | 1.00598802 | 50.4822335 | 95.786802 | 108.730964 |
| P105 | 191 | 180 | 168 | 90 | 132 | 104 | 0.47120419 | 0.73333333 | 0.61904762 | 70.398773 | 103.251534 | 81.3496933 |
| P114 | 185 | 173 | 161 | 84 | 92 | 119 | 0.45405405 | 0.53179191 | 0.73913043 | 72.6101695 | 79.5254237 | 102.864407 |
| P116 | 185 | 174 | 162 | 108 | 91 | 114 | 0.58378378 | 0.52298851 | 0.7037037 | 87.9872204 | 74.1373802 | 92.8753994 |
| P119 | 183 | 172 | 156 | 106 | 132 | 149 | 0.57923497 | 0.76744186 | 0.95512821 | 69.8449612 | 86.9767442 | 98.1782946 |
| P121 | 194 | 183 | 171 | 126 | 131 | 160 | 0.64948454 | 0.71584699 | 0.93567251 | 77.0503597 | 80.1079137 | 97.8417266 |
| P122 | 185 | 175 | 163 | 118 | 108 | 130 | 0.63783784 | 0.61714286 | 0.79754601 | 84.5224719 | 77.3595506 | 93.1179775 |
| P123 | | | | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P124 | | | | | | | | | | | | |
| P125 | | | | | | | | | | | | |
| P127 | 178 | 167 | 155 | 86 | 141 | 161 | 0.48314607 | 0.84431138 | 1.03870968 | 56.5206186 | 92.6675258 | 105.811856 |
| P128 | 180 | 172 | 158 | 107 | 144 | 177 | 0.59444444 | 0.8372093 | 1.12025316 | 63.75 | 85.7943925 | 105.455607 |
| P129 | | | | | | | | | | | | |
| P130 | 199 | 187 | 175 | 134 | 117 | 136 | 0.67336683 | 0.62566845 | 0.77714286 | 88.2945736 | 77.0930233 | 89.6124031 |
| P134 | 182 | 171 | 158 | 124 | 111 | 134 | 0.68131868 | 0.64912281 | 0.84810127 | 85.6910569 | 76.7073171 | 92.601626 |
| P135 | 194 | 184 | 173 | 120 | 162 | 191 | 0.6185567 | 0.88043478 | 1.10404624 | 64.6934461 | 87.3361522 | 102.970402 |
| P136 | 195 | 186 | 174 | 112 | 120 | 145 | 0.57435897 | 0.64516129 | 0.83333333 | 75.7559682 | 81.1671088 | 98.0769231 |
| P137 | 201 | 192 | 179 | 134 | 124 | 192 | 0.66666667 | 0.64583333 | 1.0726257 | 75.9333333 | 70.2666667 | 108.8 |
| P138 | 199 | 188 | 176 | 132 | 127 | 172 | 0.66331658 | 0.67553191 | 0.97727273 | 78.0974478 | 75.1392111 | 101.763341 |
| P139 | 210 | 200 | 186 | 133 | 104 | 145 | 0.63333333 | 0.52 | 0.77956989 | 88.7827225 | 69.4240838 | 96.7931937 |
| P140 | 200 | 189 | 177 | 114 | 157 | 203 | 0.57 | 0.83068783 | 1.14689266 | 61.3291139 | 84.4620253 | 109.208861 |
| P141 | 201 | 189 | 174 | 128 | 134 | 176 | 0.63681592 | 0.70899471 | 1.01149425 | 74.5205479 | 78.0136986 | 102.465753 |
| P143 | 214 | 207 | 198 | 145 | 143 | 180 | 0.67757009 | 0.69082126 | 0.90909091 | 79.0064103 | 77.9166667 | 98.0769231 |
| P144 | 199 | 188 | 175 | 132 | 158 | 195 | 0.66331658 | 0.84042553 | 1.11428571 | 69.4020619 | 83.0721649 | 102.525773 |
| P145 | 203 | 196 | 184 | 114 | 104 | 164 | 0.56157635 | 0.53061224 | 0.89130435 | 76.0994764 | 69.4240838 | 109.47644 |
| P147 | 205 | 194 | 182 | 132 | 190 | 204 | 0.64390244 | 0.97938144 | 1.12087912 | 63.9923954 | 92.1102662 | 98.8973384 |
| P149 | 209 | 203 | 194 | 161 | 133 | 187 | 0.77033493 | 0.65517241 | 0.96391753 | 85.3534304 | 70.5093555 | 99.1372141 |
| P152 | 207 | 201 | 191 | 127 | 146 | 198 | 0.61352657 | 0.72636816 | 1.03664921 | 68.7579618 | 79.044586 | 107.197452 |
| P154 | 180 | 169 | 156 | 80 | 88 | 144 | 0.44444444 | 0.52071006 | 0.92307692 | 65.3846154 | 71.9230769 | 117.692308 |
| P155 | 185 | 174 | 161 | 105 | 70 | 88 | 0.56756757 | 0.40229885 | 0.54658385 | 101.806084 | 67.8707224 | 85.3231939 |
| P026 | 173 | 166 | 154 | 102 | 98 | 148 | 0.58959538 | 0.59036145 | 0.96103896 | 74.7413793 | 71.8103448 | 108.448276 |
| P025 | 205 | 199 | 187 | 133 | 127 | 166 | 0.64878049 | 0.63819095 | 0.88770053 | 79.6126761 | 76.0211268 | 99.3661972 |
| P159 | 181 | 173 | 163 | 123 | 159 | 185 | 0.67955801 | 0.91907514 | 1.13496933 | 67.1627409 | 86.8201285 | 101.017131 |
| P107 | 185 | 174 | 161 | 99 | 110 | 127 | 0.53513514 | 0.63218391 | 0.78881988 | 75.1339286 | 83.4821429 | 96.3839286 |
| P157 | 172 | 163 | 148 | 151 | 145 | 189 | 0.87790698 | 0.88957055 | 1.27702703 | 79.3917526 | 76.2371134 | 99.371134 |
| P005 | 175 | 168 | 155 | 104 | 109 | 165 | 0.59428571 | 0.64880952 | 1.06451613 | 70.1587302 | 73.531746 | 111.309524 |
| P004 | 180 | 170 | 156 | 114 | 104 | 128 | 0.63333333 | 0.61176471 | 0.82051282 | 84.017341 | 76.6473988 | 94.3352601 |
| P166 | 181 | 171 | 156 | 81 | 82 | 129 | 0.44751381 | 0.47953216 | 0.82692308 | 70.7363014 | 71.609589 | 112.65411 |
| P167 | 183 | 172 | 159 | 127 | 109 | 143 | 0.69398907 | 0.63372093 | 0.89937107 | 85.4485488 | 73.3377309 | 96.2137203 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P027 | 177 | 169 | 156 | 111 | 89 | 129 | 0.62711864 | 0.52662722 | 0.82692308 | 86.0334347 | 68.9817629 | 99.9848024 |
| P148 | 210 | 204 | 192 | 128 | 110 | 142 | 0.60952381 | 0.53921569 | 0.73958333 | 85.8947368 | 73.8157895 | 95.2894737 |
| P158 | 203 | 195 | 183 | 141 | 177 | 179 | 0.69458128 | 0.90769231 | 0.97814208 | 72.3440644 | 90.8148893 | 91.8410463 |

| | Grey - Head | | | Sample - Head | | | Corrected RGB - Head | | | Standardized RGB - Head | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample | R | G | B | R | G | B | R | G | B | R | G | B |
| P120 | 211 | 203 | 192 | 133 | 137 | 140 | 0.63033175 | 0.67487685 | 0.72916667 | 82.7195122 | 85.2073171 | 87.0731707 |
| P142 | 202 | 193 | 181 | 129 | 151 | 128 | 0.63861386 | 0.78238342 | 0.70718232 | 80.625 | 94.375 | 80 |
| P002 | 201 | 190 | 178 | 120 | 176 | 166 | 0.59701493 | 0.92631579 | 0.93258427 | 66.2337662 | 97.1428571 | 91.6233766 |
| P008 | 202 | 192 | 181 | 85 | 130 | 141 | 0.42079208 | 0.67708333 | 0.77900552 | 60.8848315 | 93.1179775 | 100.997191 |
| P009 | 179 | 165 | 144 | 74 | 122 | 104 | 0.41340782 | 0.73939394 | 0.72222222 | 62.9 | 103.7 | 88.4 |
| P010 | 194 | 183 | 169 | 155 | 183 | 179 | 0.79896907 | 1 | 1.0591716 | 76.450677 | 90.2611219 | 88.2882012 |
| P011 | 188 | 177 | 161 | 126 | 152 | 140 | 0.67021277 | 0.85875706 | 0.86956522 | 76.8660287 | 92.7272727 | 85.4066986 |
| P012 | 204 | 191 | 175 | 94 | 123 | 137 | 0.46078431 | 0.64397906 | 0.78285714 | 67.7118644 | 88.6016949 | 98.6864407 |
| P014 | 200 | 188 | 174 | 100 | 145 | 159 | 0.5 | 0.7712766 | 0.9137931 | 63.1188119 | 91.5222772 | 100.358911 |
| P015 | 193 | 183 | 170 | 91 | 126 | 133 | 0.47150259 | 0.68852459 | 0.78235294 | 66.3 | 91.8 | 96.9 |
| P016 | 204 | 192 | 178 | 82 | 102 | 129 | 0.40196078 | 0.53125 | 0.7247191 | 66.8051118 | 83.0990415 | 105.095847 |
| P017 | 208 | 197 | 183 | 118 | 111 | 123 | 0.56730769 | 0.56345178 | 0.67213115 | 85.4829545 | 80.4119318 | 89.1051136 |
| P018 | 208 | 197 | 183 | 164 | 194 | 157 | 0.78846154 | 0.98477157 | 0.8579235 | 81.2038835 | 96.0582524 | 77.7378641 |
| P019 | 206 | 196 | 183 | 143 | 175 | 164 | 0.69417476 | 0.89285714 | 0.89617486 | 75.653527 | 92.5829876 | 86.7634855 |
| P020 | 209 | 198 | 184 | 128 | 131 | 100 | 0.61244019 | 0.66161616 | 0.54347826 | 90.9192201 | 93.0501393 | 71.0306407 |
| P021 | 199 | 186 | 169 | 90 | 109 | 112 | 0.45226131 | 0.58602151 | 0.66272189 | 73.7942122 | 89.3729904 | 91.8327974 |
| P022 | 204 | 192 | 178 | 98 | 97 | 126 | 0.48039216 | 0.50520833 | 0.70786517 | 77.8504673 | 77.0560748 | 100.093458 |
| P031 | 200 | 187 | 172 | 90 | 101 | 96 | 0.45 | 0.54010695 | 0.55813953 | 79.9651568 | 89.738676 | 85.2961672 |
| P032 | 204 | 193 | 179 | 127 | 149 | 129 | 0.62254902 | 0.77202073 | 0.72067039 | 79.962963 | 93.8148148 | 81.2222222 |
| P034 | 204 | 192 | 176 | 110 | 109 | 134 | 0.53921569 | 0.56770833 | 0.76136364 | 79.4617564 | 78.7393768 | 96.7988669 |
| P040 | 202 | 194 | 184 | 124 | 153 | 134 | 0.61386139 | 0.78865979 | 0.72826087 | 76.9343066 | 94.9270073 | 83.1386861 |
| P049 | | | | | | | | | | | | |
| P050 | 203 | 193 | 181 | 110 | 134 | 137 | 0.54187192 | 0.69430052 | 0.75690608 | 73.6220472 | 89.6850394 | 91.6929134 |
| P051 | 203 | 193 | 181 | 115 | 140 | 147 | 0.56650246 | 0.7253886 | 0.8121547 | 72.9477612 | 88.8059701 | 93.2462687 |
| P053 | 202 | 191 | 179 | 152 | 170 | 149 | 0.75247525 | 0.89005236 | 0.83240223 | 82.2929936 | 92.0382166 | 80.6687898 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P054 | 204 | 194 | 182 | 121 | 132 | 129 | 0.59313725 | 0.68041237 | 0.70879121 | 80.7722513 | 88.1151832 | 86.1125654 |
| P055 | 201 | 195 | 182 | 118 | 132 | 131 | 0.58706468 | 0.67692308 | 0.71978022 | 78.976378 | 88.3464567 | 87.6771654 |
| P056 | 201 | 190 | 178 | 90 | 99 | 110 | 0.44776119 | 0.52105263 | 0.61797753 | 76.7558528 | 84.4314381 | 93.812709 |
| P057 | 202 | 193 | 182 | 91 | 96 | 109 | 0.45049505 | 0.49740933 | 0.5989011 | 78.3952703 | 82.7027027 | 93.902027 |
| P058 | 208 | 198 | 186 | 118 | 119 | 141 | 0.56730769 | 0.6010101 | 0.75806452 | 79.6031746 | 80.2777778 | 95.1190476 |
| P059 | 210 | 201 | 190 | 125 | 114 | 153 | 0.5952381 | 0.56716418 | 0.80526316 | 81.3137755 | 74.1581633 | 99.5280612 |
| P060 | 212 | 202 | 192 | 169 | 149 | 164 | 0.79716981 | 0.73762376 | 0.85416667 | 89.4087137 | 78.8278008 | 86.7634855 |
| P061 | 208 | 202 | 191 | 97 | 114 | 113 | 0.46634615 | 0.56435644 | 0.59162304 | 76.3425926 | 89.7222222 | 88.9351852 |
| P062 | 217 | 208 | 198 | 112 | 136 | 166 | 0.51612903 | 0.65384615 | 0.83838384 | 68.9855072 | 83.7681159 | 102.246377 |
| P064 | 219 | 210 | 201 | 149 | 138 | 187 | 0.6803653 | 0.65714286 | 0.93034826 | 80.1582278 | 74.2405063 | 100.601266 |
| P071 | 215 | 207 | 197 | 93 | 102 | 105 | 0.43255814 | 0.49275362 | 0.53299492 | 79.05 | 86.7 | 89.25 |
| P074 | 211 | 203 | 192 | 123 | 143 | 158 | 0.58293839 | 0.7044335 | 0.82291667 | 73.9740566 | 86.0023585 | 95.0235849 |
| P075 | 207 | 202 | 192 | 110 | 124 | 135 | 0.53140097 | 0.61386139 | 0.703125 | 76.0162602 | 85.6910569 | 93.2926829 |
| P078 | 207 | 198 | 188 | 130 | 124 | 158 | 0.62801932 | 0.62626263 | 0.84042553 | 80.461165 | 76.7475728 | 97.7912621 |
| P079 | 212 | 204 | 195 | 142 | 127 | 155 | 0.66981132 | 0.62254902 | 0.79487179 | 85.4009434 | 76.379717 | 93.2193396 |
| P080 | 210 | 201 | 192 | 162 | 128 | 153 | 0.77142857 | 0.63681592 | 0.796875 | 93.2505643 | 73.6794582 | 88.0699774 |
| P081 | 202 | 193 | 178 | 132 | 125 | 132 | 0.65346535 | 0.64766839 | 0.74157303 | 86.529563 | 81.940874 | 86.529563 |
| P082 | 207 | 200 | 187 | 151 | 140 | 164 | 0.7294686 | 0.7 | 0.87700535 | 84.6263736 | 78.4615385 | 91.9120879 |
| P083 | 210 | 200 | 189 | 119 | 135 | 171 | 0.56666667 | 0.675 | 0.9047619 | 71.4 | 81 | 102.6 |
| P086 | 212 | 202 | 191 | 153 | 140 | 162 | 0.72169811 | 0.69306931 | 0.84816754 | 85.7472527 | 78.4615385 | 90.7912088 |
| P087 | | | | | | | | | | | | |
| P088 | 194 | 185 | 173 | 128 | 118 | 152 | 0.65979381 | 0.63783784 | 0.87861272 | 82.0100503 | 75.6030151 | 97.3869347 |
| P089 | 195 | 179 | 166 | 95 | 83 | 104 | 0.48717949 | 0.46368715 | 0.62650602 | 85.9042553 | 75.0531915 | 94.0425532 |
| P091 | 193 | 184 | 171 | 86 | 91 | 123 | 0.44559585 | 0.49456522 | 0.71929825 | 73.1 | 77.35 | 104.55 |
| P094 | 198 | 188 | 175 | 123 | 163 | 176 | 0.62121212 | 0.86702128 | 1.00571429 | 67.8896104 | 89.9675325 | 97.1428571 |
| P095 | | | | | | | | | | | | |
| P096 | 190 | 180 | 167 | 110 | 101 | 132 | 0.57894737 | 0.56111111 | 0.79041916 | 81.7784257 | 75.0874636 | 98.1341108 |
| P097 | 190 | 176 | 149 | 96 | 82 | 110 | 0.50526316 | 0.46590909 | 0.73825503 | 85 | 72.6041667 | 97.3958333 |
| P098 | 179 | 168 | 150 | 101 | 121 | 138 | 0.56424581 | 0.7202381 | 0.92 | 71.5416667 | 85.7083333 | 97.75 |
| P099 | 201 | 191 | 178 | 134 | 125 | 163 | 0.66666667 | 0.65445026 | 0.91573034 | 80.971564 | 75.5331754 | 98.4952607 |
| P100 | 175 | 165 | 154 | 94 | 113 | 107 | 0.53714286 | 0.68484848 | 0.69480519 | 76.3375796 | 91.7675159 | 86.8949045 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P101 | 196 | 187 | 176 | 145 | 193 | 180 | 0.73979592 | 1.03208556 | 1.02272727 | 71.3803089 | 95.0096525 | 88.6100386 |
| P102 | 193 | 183 | 172 | 124 | 165 | 131 | 0.64248705 | 0.90163934 | 0.76162791 | 75.2857143 | 100.178571 | 79.5357143 |
| P103 | 185 | 172 | 157 | 98 | 129 | 120 | 0.52972973 | 0.75 | 0.76433121 | 72.0172911 | 94.7982709 | 88.184438 |
| P104 | | | | | | | | | | | | |
| P105 | 191 | 180 | 168 | 87 | 141 | 143 | 0.45549738 | 0.78333333 | 0.85119048 | 59.7978437 | 96.9137466 | 98.2884097 |
| P114 | 185 | 173 | 161 | 151 | 166 | 194 | 0.81621622 | 0.95953757 | 1.20496894 | 75.3522505 | 82.8375734 | 96.8101761 |
| P116 | | | | | | | | | | | | |
| P119 | | | | | | | | | | | | |
| P121 | 194 | 183 | 171 | 145 | 175 | 200 | 0.74742268 | 0.95628415 | 1.16959064 | 71.1057692 | 85.8173077 | 98.0769231 |
| P122 | | | | | | | | | | | | |
| P123 | | | | | | | | | | | | |
| P124 | 179 | 170 | 157 | 78 | 100 | 98 | 0.43575419 | 0.58823529 | 0.62420382 | 72.0652174 | 92.3913043 | 90.5434783 |
| P125 | 179 | 171 | 157 | 79 | 101 | 101 | 0.44134078 | 0.59064327 | 0.6433121 | 71.6903915 | 91.6548043 | 91.6548043 |
| P127 | 178 | 167 | 155 | 132 | 177 | 182 | 0.74157303 | 1.05988024 | 1.17419355 | 68.5539715 | 91.9246436 | 94.5213849 |
| P128 | 180 | 172 | 158 | 135 | 135 | 170 | 0.75 | 0.78488372 | 1.07594937 | 78.2386364 | 78.2386364 | 98.5227273 |
| P129 | 197 | 187 | 175 | 135 | 148 | 130 | 0.68527919 | 0.79144385 | 0.74285714 | 83.3535109 | 91.3801453 | 80.2663438 |
| P130 | 199 | 187 | 175 | 98 | 135 | 151 | 0.49246231 | 0.72192513 | 0.86285714 | 65.078125 | 89.6484375 | 100.273438 |
| P134 | 182 | 171 | 158 | 123 | 142 | 165 | 0.67582418 | 0.83040936 | 1.0443038 | 72.9418605 | 84.2093023 | 97.8488372 |
| P135 | 194 | 184 | 173 | 134 | 165 | 170 | 0.69072165 | 0.89673913 | 0.98265896 | 72.8571429 | 89.7121535 | 92.4307036 |
| P136 | 195 | 186 | 174 | 136 | 160 | 161 | 0.6974359 | 0.86021505 | 0.92528736 | 75.8862144 | 89.2778993 | 89.8358862 |
| P137 | 201 | 192 | 179 | 132 | 134 | 153 | 0.65671642 | 0.69791667 | 0.8547486 | 80.3341289 | 81.5513126 | 93.1145585 |
| P138 | 199 | 188 | 176 | 121 | 160 | 160 | 0.6080402 | 0.85106383 | 0.90909091 | 69.9659864 | 92.5170068 | 92.5170068 |
| P139 | 210 | 200 | 186 | 143 | 170 | 173 | 0.68095238 | 0.85 | 0.93010753 | 75.0308642 | 89.1975309 | 90.7716049 |
| P140 | 200 | 189 | 177 | 142 | 177 | 177 | 0.71 | 0.93650794 | 1 | 73.0040323 | 90.9979839 | 90.9979839 |
| P141 | | | | | | | | | | | | |
| P143 | 214 | 207 | 198 | 128 | 166 | 175 | 0.59813084 | 0.80193237 | 0.88383838 | 69.5948827 | 90.2558635 | 95.1492537 |
| P144 | 199 | 188 | 175 | 126 | 167 | 185 | 0.63316583 | 0.88829787 | 1.05714286 | 67.2175732 | 89.0899582 | 98.6924686 |
| P145 | 203 | 196 | 184 | 112 | 121 | 162 | 0.55172414 | 0.61734694 | 0.88043478 | 72.3037975 | 78.1139241 | 104.582278 |
| P147 | 205 | 194 | 182 | 132 | 161 | 161 | 0.64390244 | 0.82989691 | 0.88461538 | 74.1409692 | 90.4295154 | 90.4295154 |
| P149 | 209 | 203 | 194 | 145 | 144 | 184 | 0.6937799 | 0.70935961 | 0.94845361 | 78.1712474 | 77.6321353 | 99.1966173 |
| P152 | 207 | 201 | 191 | 144 | 165 | 164 | 0.69565217 | 0.82089552 | 0.85863874 | 77.6321353 | 88.9534884 | 88.4143763 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P154 | 180 | 169 | 156 | 136 | 133 | 164 | 0.75555556 | 0.78698225 | 1.05128205 | 80.0923788 | 78.3256351 | 96.5819861 |
| P155 | | | | | | | | | | | | |
| P026 | 173 | 166 | 154 | 87 | 119 | 136 | 0.50289017 | 0.71686747 | 0.88311688 | 64.8684211 | 88.7280702 | 101.403509 |
| P025 | 205 | 199 | 187 | 89 | 117 | 116 | 0.43414634 | 0.5879397 | 0.62032086 | 70.4813665 | 92.6552795 | 91.863354 |
| P159 | 181 | 173 | 163 | 124 | 148 | 136 | 0.68508287 | 0.85549133 | 0.83435583 | 77.5 | 92.5 | 85 |
| P107 | 185 | 174 | 161 | 112 | 133 | 133 | 0.60540541 | 0.76436782 | 0.82608696 | 75.5555556 | 89.7222222 | 89.7222222 |
| P157 | 172 | 163 | 148 | 122 | 143 | 155 | 0.70930233 | 0.87730061 | 1.0472973 | 74.0714286 | 86.8214286 | 94.1071429 |
| P005 | 175 | 168 | 155 | 105 | 106 | 157 | 0.6 | 0.63095238 | 1.01290323 | 72.7581522 | 73.451087 | 108.790761 |
| P004 | 180 | 170 | 156 | 94 | 98 | 124 | 0.52222222 | 0.57647059 | 0.79487179 | 75.8544304 | 79.0822785 | 100.063291 |
| P166 | 181 | 171 | 156 | 108 | 132 | 151 | 0.59668508 | 0.77192982 | 0.96794872 | 70.4347826 | 86.0869565 | 98.4782609 |
| P167 | | | | | | | | | | | | |
| P027 | 177 | 169 | 156 | 169 | 156 | 174 | 0.95480226 | 0.92307692 | 1.11538462 | 86.3627255 | 79.7194389 | 88.9178357 |
| P148 | 210 | 204 | 192 | 124 | 114 | 155 | 0.59047619 | 0.55882353 | 0.80729167 | 80.4580153 | 73.9694656 | 100.572519 |
| P158 | 203 | 195 | 183 | 134 | 141 | 128 | 0.66009852 | 0.72307692 | 0.69945355 | 84.7890819 | 89.2183623 | 80.9925558 |

**Table 1.**

| ID # | | species | county | locality | loc. # | lat | long | collectors | ridge |
|---|---|---|---|---|---|---|---|---|---|
| P 001 | F | *P. youngi* | Marion | Ocala Nat. For., W of Lake Kerr | 4 | 29.34821 | -81.81608 | Daniel Dye | Mt.Dora |
| P 002 | M | *P. youngi* | Marion | Ocala Nat. For., W of Lake Kerr | 4 | 29.34821 | -81.81608 | Daniel Dye | Mt. Dora |
| P 003 | F | *P. profundus* | Hernando | Sunshine Grove Rd at Sandy Dr | 2 | 28.5808 | -82.4998 | Mansell | Southern Brooksville (S) |
| P 004 | | *P. profundus* | Citrus | N Parkwood Ave, S of W Oakhill St. | 1 | 29.01604 | -82.53441 | Moler | Southern Brooksville (N) |
| P 005 | | *P. profundus* | Citrus | N Parkwood Ave, S of W Oakhill St. | 1 | 29.01604 | -82.53441 | Moler | Southern Brooksville (N) |
| P 006 | | *P. profundus* | Citrus | N Camae Point | 3 | 29.00785 | -82.5243 | Moler | Southern Brooksville (N) |
| P 007 | | *P. youngi* | Marion | Ocala Nat. For., W of Lake Kerr | 4 | 29.34821 | -81.81608 | Daniel Dye | Mt. Dora |
| P 008 | M | *P. youngi* | Marion | Ocala Nat. For FL Hwy 40, 0.5 mi W FR 11 | 12 | 29.1799 | -81.7755 | Moler | Mt. Dora |
| P 009 | M | *P. youngi* | Marion | Ocala Nat. For FL Hwy 40, 0.5 mi W FR 11 | 12 | 29.1799 | -81.7755 | Moler | Mt. Dora |
| P 010 | M | *P. youngi* | Marion | Ocala Nat. For. FR 11, 0.4 mi S Co Rd 314 | 11 | 29.3213 | -81.7736 | Moler | Mt. Dora |
| P 011 | M | *P. youngi* | Marion | Ocala Nat. For. FR 11, 0.4 mi S Co Rd 314 | 11 | 29.3213 | -81.7736 | Moler | Mt. Dora |
| P 012 | M | *P. youngi* | Marion | Ocala Nat. For. FR 11, 0.4 mi S Co Rd 314 | 11 | 29.3213 | -81.7736 | Moler | Mt. Dora |
| P 013 | F | *P. youngi* | Marion | Ocala Nat. For. FR 11, 0.4 mi S Co Rd 314 | 11 | 29.3213 | -81.7736 | Moler | Mt. Dora |
| P 014 | M | *P. youngi* | Marion | Ocala Nat. For. FL Hwy 40, 0.5 mi W FR 11 | 12 | 29.1799 | -81.7755 | Moler | Mt. Dora |
| P 015 | M | *P. youngi* | Putnam | Ocala Nat. For. FR 66, 0.3 mi E SR 19 | 10 | 29.4342 | -81.7325 | Moler | Mt. Dora |
| P 016 | M | *P. youngi* | Putnam | Ocala Nat. For. FR 66, 0.3 mi E SR 19 | 10 | 29.4342 | -81.7325 | Moler | Mt. Dora |
| P 017 | M | *P. youngi?* | Putnam | Ocala Nat. For. FR 66, 0.3 mi E SR 19 | 10 | 29.4342 | -81.7325 | Moler | Mt. Dora |
| P 018 | M | *P. youngi* | Putnam | Ocala Nat. For. FR 66, 0.3 mi E SR 19 | 10 | 29.4342 | -81.7325 | Moler | Mt. Dora |
| P 019 | M | *P. youngi* | Putnam | Ocala Nat. For. FR 66, 0.3 mi E SR 19 | 10 | 29.4342 | -81.7325 | Moler | Mt. Dora |

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|---|---|---|---|---|---|---|---|---|---|
| P 020 | M | *P. youngi?* | Putnam | Ocala Nat. For. FR 66, 0.3 mi E SR 19 | 10 | 29.4342 | -81.7325 | Moler | Mt. Dora |
| P 021 | M | *P. youngi* | Putnam | Ocala Nat. For. FR 66, 0.3 mi E SR 19 | 10 | 29.4342 | -81.7325 | Moler | Mt. Dora |
| P 022 | M | *P. profundus* | Levy | SR 24, 0.3 mi W Alachua Co line | 13 | 29.5097 | -82.5616 | Moler | Northern Brooksville |
| P 023 | M | *P. youngi?* | Putnam | Lake Galilee Dr., 0.15 N FL Hwy 20 | 9 | 29.6264 | -81.9514 | Moler | Trail |
| P 024 | M | *P. youngi?* | Putnam | Lake Galilee Dr., 0.15 N FL Hwy 20 | 9 | 29.6264 | -81.9514 | Moler | Trail |
| P 025 | | *P. profundus?* | Marion | Hwy 25 | 7 | 29.04203 | -81.97864 | Moler | |
| P 026 | | *P. profundus* | Marion | Indian Lake State Forest | 5 | 29.28685 | -82.0661 | Moler | |
| P 027 | | *P. profundus* | Marion | Indian Lake State Forest | 5 | 29.28685 | -82.0661 | Moler | |
| P 028 | | *P. profundus?* | Marion | Silver Spring Shores, Emerald Dr. | 6 | 29.09329 | -82.00845 | Moler | |
| P 029 | | *P. profundus?* | Marion | Silver Spring Shores, Emerald Dr. | 6 | 29.09329 | -82.00845 | Moler | |
| P 030 | | *P. profundus?* | Marion | Silver Spring Shores, Emerald Dr. | 6 | 29.09329 | -82.00845 | Moler | |
| P 031 | M | *P. youngi* | Putnam | Etoniah State Forest | 14 | 29.7232 | -81.8276 | Moler | Mt. Dora |
| P 032 | M | *P. youngi* | Putnam | Etoniah State Forest | 14 | 29.7232 | -81.8276 | Moler | Mt. Dora |
| P 033 | F | *P. profundus* | Levy | 6.6 mi SW Williston; E Levy St & SE141Cr | 16 | 29.3313 | -82.5361 | Moler | Northern Brooksville |
| P 034 | M | *P. profundus* | Levy | 4.5 mi WSW Williston; NE 20 St, 0.6 mi W SR121 | 15 | 29.3597 | -82.5139 | Moler | Northern Brooksville |
| P 035 | F | *P. profundus* | Levy | SR 24, 0.3 mi W Alachua Co line | 13 | 29.5097 | -82.5616 | Moler | Northern Brooksville |
| P 036 | | *P. profundus* | Levy | SR 24, 0.3 mi W Alachua Co line | 13 | 29.5097 | -82.5616 | Moler | Northern Brooksville |
| P 037 | | *P. profundus* | Levy | SR 24, 0.3 mi W Alachua Co line | 13 | 29.5097 | -82.5616 | Moler | Northern Brooksville |
| P 038 | | *P. profundus* | Levy | SR 24, 0.3 mi W Alachua Co line | 13 | 29.5097 | -82.5616 | Moler | Northern Brooksville |
| P 039 | | *P. profundus* | Levy | SR 24, 0.3 mi W Alachua Co line | 13 | 29.5097 | -82.5616 | Moler | Northern Brooksville |
| P 040 | M | *P. youngi* | Marion | SR 42, 2 mi E SE 182 Ave Rd | 19 | 28.9791 | -81.7704 | Moler | Mt. Dora |
| P 041 | | *P. youngi?* | Lake | SR 44 jct SR 46A | 17 | 28.8509 | -81.5303 | Moler | Mt. Dora? |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| P 042 | | *P. youngi?* | Lake | W Huff Rd, 2 mi N SR 44 | 18 | 28.855 | -81.5267 | Moler | Mt. Dora? |
| P 043 | | *P. youngi?* | Lake | W Huff Rd, 2 mi N SR 44 | 18 | 28.855 | -81.5267 | Moler | Mt. Dora? |
| P 044 | | *P. youngi?* | Lake | W Huff Rd, 2 mi N SR 44 | 18 | 28.855 | -81.5267 | Moler | Mt. Dora? |
| P 045 | | *P. youngi* | Putnam | Ocala Nat. For.(vial 1) | 20 | 29.4906 | -81.8102 | Daniel Dye | Mt. Dora |
| P 046 | | *P. youngi* | Marion | Ocala Nat. For. (vial 2) | 21 | 29.4879 | -81.8606 | Daniel Dye | Mt. Dora |
| P 047 | | *P. youngi* | Putnam | Ocala Nat. For. (vial 4) | 23 | 29.4041 | -81.7413 | Daniel Dye | Mt. Dora |
| P 048 | F | *P. youngi?* | Alachua | Holden Park Rd., 0.2 mi NW Putnam Co line | 24 | 29.546 | -82.058 | Moler | Mt. Dora |
| P 049 | M | *P. youngi?* | Alachua | Holden Park Rd., 0.2 mi NW Putnam Co line | 24 | 29.546 | -82.058 | Moler | Mt. Dora |
| P 050 | M | *P. youngi* | Putnam | Baden Powell Rd at SR 20 | 25 | 29.6154 | -81.978 | Moler | Mt. Dora |
| P 051 | M | *P. youngi* | Putnam | Baden Powell Rd at SR 20 | 25 | 29.6154 | -81.978 | Moler | Mt. Dora |
| P 052 | | *P. youngi* | Clay | SR 21, 2.2 mi NE SR100 | 26 | 29.8099 | -82.0091 | Moler | Trail |
| P 053 | M | *P. youngi* | Clay | SR 21, 2.2 mi NE SR100 | 26 | 29.8099 | -82.0091 | Moler | Trail |
| P 054 | M | *P. youngi* | Clay | SR 21, 2.2 mi NE SR100 | 26 | 29.8099 | -82.0091 | Moler | Trail |
| P 055 | M | *P. youngi* | Clay | SR 21, 2.2 mi NE SR100 | 26 | 29.8099 | -82.0091 | Moler | Trail |
| P 056 | M | *P. profundus* | Dixie | US 19, 5.3 mi W Old Town | 32 | 29.60855 | -83.07015 | Moler | |
| P 057 | F | *P. profundus* | Dixie | Co Rd 361, 2.1 mi S Co Rd 358 (S. Jena) | 33 | 29.63539 | -83.35489 | Moler | |
| P 058 | M | *P. profundus* | Dixie | Co Rd 361, 2.1 mi S Co Rd 358 (S. Jena) | 33 | 29.63539 | -83.35489 | Moler | |
| P 059 | M | *P. profundus* | Dixie | Co Rd 361, 2.1 mi S Co Rd 358 (S. Jena) | 33 | 29.63539 | -83.35489 | Moler | |
| P 060 | M | *P. profundus* | Dixie | Co Rd 361, 2.1 mi S Co Rd 358 (S. Jena) | 33 | 29.63539 | -83.35489 | Moler | |
| P 061 | M | *P. profundus?* | Alachua | Holden Park Rd, 0.25 mi NW Putnam Co line | 24 | 29.5462 | -82.058 | Moler | Mt. Dora |
| P 062 | M | *P. p. dubius* | Volusia | De Leon Springs | 30 | 29.1363 | -81.3565 | Moler | Deland |
| P 063 | F | *P. p. dubius* | Volusia | De Leon Springs | 30 | 29.1363 | -81.3565 | Moler | Deland |
| P 064 | M | *P. profundus* | Gilchrist | SR 26, 3.0 mi W Alachua Co line | 34 | 29.6314 | -82.7048 | Moler | Northern Brooksville |
| P 065 | F | *P. profundus* | Gilchrist | SR 26, 3.0 mi W Alachua Co line | 34 | 29.6314 | -82.7048 | Moler | Northern Brooksville |
| P 066 | M | *P. profundus?* | Clay | Hwy 21 at Gas Line Rd | | 29.80734 | -82.01186 | Moler | Trail |

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|---|---|---|---|---|---|---|---|---|---|
| P 067 | F | *P. profundus* | Madison | CR 53, 0.25 mi N Lafayette Co line | 38 | 30.2635 | -83.2833 | Moler | |
| P 068 | F | *P. profundus* | Lafayette | CR 53, 1.2 mi N US 27 | 37 | 30.1462 | -83.2932 | Moler | |
| P 069 | F | *P. profundus* | Dixie | CR 349, 0.15 mi SCR 351A (NE 512 Ave) | 43 | 29.7064 | -82.9846 | Moler | |
| P 070 | F | *P. profundus* | Dixie | US 19, 5.3 mi W Old Town | | 29.60855 | -83.07015 | Moler | |
| P 071 | M | *P. profundus* | Taylor | Beach Rd. (CR361) 8.9 mi N Steinhatchee | 40 | 29.7607 | -83.4975 | Moler | |
| P 072 | F | *P. profundus* | Taylor | Hampton Spring Rd, 0.4 mi NE Coney Island | 42 | 30.0409 | -83.7266 | Moler | |
| P 073 | F | *P. profundus* | Taylor | Hampton Spring Rd, 0.4 mi NE Coney Island | 42 | 30.0409 | -83.7266 | Moler | |
| P 074 | M | *P. profundus* | Taylor | FL Hwy 51, 4.9 mi S US 19 | 39 | 29.7186 | -83.3607 | Moler | |
| P 075 | M | *P. profundus* | Taylor | FL Hwy 51, 4.9 mi S US 19 | 39 | 29.7186 | -83.3607 | Moler | |
| P 076 | F | *P. profundus* | Gilchrist | CR 340, 2.15 mi E US 129 | 43 | 29.7955 | -82.8311 | Moler | |
| P 077 | F | *P. profundus* | Gilchrist | CR 340, 2.15 mi E US 129 | 43 | 29.7955 | -82.8311 | Moler | |
| P 078 | M | *P. profundus* | Hamilton | SR 6, ~1 mi W I-75 | | 30.50637 | -83.06778 | | |
| P 079 | M | *P. profundus* | Hamilton | CR 141, ~4.8 mi S SR6 | | 30.42931 | -83.17017 | | |
| P 080 | M | *P. profundus* | Hamilton | CR 141. ~4.8 mi S SR6 | | 30.42931 | -81.17017 | | |
| P 081 | M | *P. profundus* | Marion | CR 326, ENE 58th Ave. | | 29.23983 | -82.05167 | | |
| P 082 | M | *P. profundus* | Hamilton | CR 141, ~ 4.8 mi S SR6 | | 30.42931 | -83.17017 | | |
| P 083 | M | *P. profundus* | Marion | CR 326 ENE 58th ave. | | 29.23983 | -82.05167 | | |
| P 084 | | *Mycotrupes gaigei* | Marion | CR 326 ENE 58th ave. | | | | | Cotton Plant |
| P 085 | | *Geotrupes egeriei* | Alachua | Fl. 7818 SW CR 346 | | | | | |
| P 086 | M | *P. profundus* | Marion | Fl. Co. Rd. 326 E of NE 58th Ave. | | 29.2403 | -82.051 | P. Moler | |
| P 087 | M | *P. profundus* | Hamilton | Fl. SR 6, 0.08 mi E SW CR 143 | | 30.48575 | -83.19907 | P. Moler | |
| P 088 | M | *P. profundus* | Hamilton | Fl. SR 6, 0.08 mi E SW CR 144 | | 30.48575 | -83.19907 | P. Moler | |
| P 089 | M | *P. profundus* | Hamilton | Fl. SR 6, 0.08 mi E SW CR 145 | | 30.48575 | -83.19907 | P. Moler | |
| P 090 | F | *P. profundus* | Marion | Fl. US 27, 1.3 mi N SR 42. | | 28.9987 | -81.99824 | P. Moler | |
| P 091 | M | *P. profundus* | Marion | Fl. US 41 0.5 mi S CR 464 | | 29.23511 | -82.44105 | P. Moler | |

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|---|---|---|---|---|---|---|---|---|---|
| P 092 | F | *P. profundus* | Marion | Fl. US 41 0.5 mi S CR 464 at Rainbow Springs | | 29.08914 | -82.45154 | P. Moler | |
| P 093 | M | *P. profundus* | Madison | I-10 E-bound rest area | | 30.36751 | -83.24831 | P. Moler | |
| P 094 | M | *P. profundus* | Madison | I-10 E-bound rest area | | 30.36751 | -83.24831 | P. Moler | |
| P 095 | M | *P. profundus* | Madison | I-10 E-bound rest area | | 30.36751 | -83.24831 | P. Moler | |
| P 096 | M | *P. profundus* | Madison | Twin Rivers State Forest | | 30.59969 | -83.26375 | P. Moler | |
| P 097 | M | *P. profundus* | Madison | Twin Rivers State Forest | | 30.59969 | -83.26375 | P. Moler | |
| P 098 | M | *P. profundus* | Madison | Twin Rivers State Forest | | 30.59969 | -83.26375 | P. Moler | |
| P 099 | M | *P. profundus* | Madison | Twin Rivers State Forest | | 30.59969 | -83.26375 | P. Moler | |
| P 100 | M | *P. youngi* | Marion | SE 112th Place | | 29.06292 | -81.90894 | P. Moler | |
| P 101 | M | *P. youngi* | Marion | SE 112th Place | | 29.06292 | -81.90894 | P. Moler | |
| P 102 | M | *P. youngi* | Marion | SE 112th Place | | 29.06292 | -81.90894 | P. Moler | |
| P 103 | M | *P. youngi* | Marion | SE 112th Place | | 29.06292 | -81.90894 | P. Moler | |
| P 104 | M | *P. youngi* | Marion | Ocala Nat. Forest, S border | | 28.9766 | -81.772 | P. Moler | |
| P 105 | M | *P. youngi* | Marion | Ocala Nat. Forest, S border | | 28.9766 | -81.772 | P. Moler | |
| P 106 | M | *P. p. dubius* | Volusia | US 17 0.13 mi S Spring Garden Ranch Rd. | | 29.13355 | -81.35167 | P. Moler | S Spring Garden Ranch |
| P 107 | | *P. p. dubius* | Volusia | US 17 0.13 mi S Spring Garden Ranch Rd. | | 29.13355 | -81.35167 | P. Moler | S Spring Garden Ranch |
| P 108 | | *P. p. dubius* | Putnam | Lake Cond Dr., 0.25 mi S US 17 | | 29.4885 | -81.5867 | P. Moler | Cresent City |
| P 109 | F | *P. profundus* | Marion | Fl. US 27 1.2 mi N jct SR | | 42.99697 | -81.99745 | P. Moler | |
| P 110 | F | *P. profundus* | Marion | Fl. US 27 1.2 mi N jct SR | | 42.99697 | -81.99745 | P. Moler | |
| P 111 | F | *P. profundus* | Osceola | US 192 at Co Rd. 500 A | | 28.22411 | -81.18109 | P. Moler | |
| P 112 | F | *P. profundus* | Osceola | US 192 at Co Rd. 500 A | | 28.22411 | -81.18109 | P. Moler | |
| P 113 | F | *P. profundus* | Osceola | US 192 at Co Rd. 500 A | | 28.22411 | -81.18109 | P. Moler | |
| P 114 | M | *P. profundus* | Polk | Tiger Creek Preserve | | 27.809 | -81.4896 | P. Moler | Lake Wales |
| P 115 | F | *P. profundus* | Polk | Tiger Creek Preserve | | 27.809 | -81.4896 | P. Moler | Lake Wales |
| P 116 | M | *P. profundus* | Indian River | Roseland | | 27.83766 | -80.48475 | P. Moler | Atlantic Coastal |
| P 117 | F | *P. profundus* | Indian River | Roseland | | 27.83766 | -80.48475 | P. Moler | Atlantic Coastal |

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|---|---|---|---|---|---|---|---|---|---|
| P 118 | F | *P. profundus* | Indian River | Roseland | | 27.83766 | -80.48475 | P. Moler | Atlantic Coastal |
| P 119 | F | *P. profundus* | Indian River | Roseland | | 27.83766 | -80.48475 | P. Moler | Atlantic Coastal |
| P 120 | M | *P. profundus* | Indian River | Roseland | | 27.83766 | -80.48475 | P. Moler | Atlantic Coastal |
| P 121 | M | *P. profundus* | Indian River | Roseland | | 27.83766 | -80.48475 | P. Moler | Atlantic Coastal |
| P 122 | M | *P. profundus* | Indian River | Roseland | | 27.83766 | -80.48475 | P. Moler | Atlantic Coastal |
| P 123 | M | *P. profundus* | Highlands | US 27, S side of Josephine Ck. | | 27.3719 | -81.40122 | P. Moler | Lake Wales |
| P 124 | F | *P. profundus* | Highlands | US 27, S side of Josephine Ck. | | 27.3719 | -81.40122 | P. Moler | Lake Wales |
| P 125 | M | *P. profundus* | Polk | Hwy 630 E of Frostproof | | 27.75978 | -81.46325 | P. Moler | Lake Wales |
| P 126 | F | *P. profundus* | Polk | Hwy 580 E of Haines City | | 28.12093 | -81.55084 | P. Moler | Lake Wales |
| P 127 | M | *P. profundus* | Polk | Hwy 580 E of Haines City | | 28.12093 | -81.55084 | P. Moler | Lake Wales |
| P 128 | M | *P. profundus* | Polk | Hwy 580 E of Haines City | | 28.12093 | -81.55084 | P. Moler | Lake Wales |
| P 129 | M | *P. profundus* | Polk | Hwy 580 E of Haines City | | 28.12093 | -81.55084 | P. Moler | Lake Wales |
| P 130 | M | *P. profundus* | Polk | Hwy 580 E of Haines City | | 28.12093 | -81.55084 | P. Moler | Lake Wales |
| P 131 | F | *P. profundus* | Marion | Fl. US 41 0.5 mi S CR 464 at Rainbow Springs | | 29.08914 | -82.45154 | P. Moler | |
| P 132 | F | *P. profundus* | Marion | | | 29.19319 | -82.40241 | P. Moler | Cotton Plant |
| P 133 | F | *P. profundus* | Marion | | | 29.19319 | -82.40241 | P. Moler | Cotton Plant |
| P 134 | M | *P. profundus* | Marion | | | 29.19319 | -82.40241 | P. Moler | Cotton Plant |
| P 135 | M | *P. profundus* | Lake | SE of SR 44 jct SR 46A | 17 | 28.8509 | -81.5303 | P. Moler | |
| P 136 | M | *P. profundus* | Lake | SE of SR 44 jct SR 46A | 17 | 28.8509 | -81.5303 | P. Moler | |
| P 137 | M | *P. profundus* | Lake | NE jct SR44 and La Place Ct. | | 28.8516 | -81.5656 | P. Moler | |
| P 138 | M | *P. profundus* | Lake | NE jct SR44 and La Place Ct. | | 28.8516 | -81.5656 | P. Moler | |
| P 139 | M | *P. profundus* | Lake | NE jct SR44 and La Place Ct. | | 28.8516 | -81.5656 | P. Moler | |
| P 140 | M | *P. profundus* | Lake | NE jct SR44 and La Place Ct. | | 28.8516 | -81.5656 | P. Moler | |
| P 141 | M | *P. profundus* | Lake | NE jct SR44 and La Place Ct. | | 28.8516 | -81.5656 | P. Moler | |

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|---|---|---|---|---|---|---|---|---|---|
| P 142 | M | *P. youngi* | Lake | Powerline Rd. E of SR 19 | | 29.051 | -81.6341 | P. Moler | |
| P143 | M | *P. profundus* | Marion | CR 326 ENE 58th Ave. | | 29.2406 | -82.0516 | P. Moler | |
| P144 | M | *P. profundus* | Marion | CR 326 ENE 58th Ave. | | 29.2406 | -82.0516 | P. Moler | |
| P145 | M | *P. profundus* | Marion | CR 326 ENE 58th Ave. | | 29.2406 | -82.0516 | P. Moler | |
| P146 | M | *P. profundus* | Marion | CR 326 ENE 58th Ave. | | 29.2406 | -82.0516 | P. Moler | Not Tissued |
| P146 | | *P. youngi* | Marion | Ocala NF SR40, 0.4 Mi W FR 11 | | 29.1783 | -81.777 | P. Moler | |
| P147 | | *P. youngi* | Marion | Ocala Nat. For. FR 11, 0.4 mi S Co Rd 314 | | 29.3219 | -81.7727 | P. Moler | |
| 148 | F | profundeus | MarioN | | | | | | |
| 149 | M | dubius | | | | | | | |
| 150 | F | profunus | Marion | | | | | | |
| 151 | M | | | | | | | | |
| 152 | M | | | | | | | | |
| 153 | M | | | | | | | | |
| 154 | M | | | | | | | | |
| 155 | M | | | | | | | | |
| 156 | M | | | | | | | | |
| 157 | M | | | | | | | | |
| 158 | M | | | | | | | | |
| 159 | M | | | | | | | | |
| P148 | M | *P. profundus* | Citrus | W. Basket Way at N Travis Dr. | | 28.9889 | -82.4482 | P. Moler | Not tissued |
| P149 | M | *P. profundus* | Citrus | W. Basket Way at N Travis Dr. | | 28.9889 | -82.4482 | P. Moler | |
| P150 | F | *P. profundus* | Levy | US Hwy 41, 1.4 mi N Marion Co. line | | 29.2349 | -82.441 | P. Moler | |
| P151 | F | *P. profundus* | Marion | FL Hwy 4 at SE 172 Terr. | | 29.1727 | -81.866 | P. Moler | |
| P152 | M | *P. profundus* | Marion | FL Hwy 4 at SE 172 Terr. | | 29.1727 | -81.866 | P. Moler | |
| P153 | F | *P. profundus* | Highlands | US 27, S side of Josephine Ck. | | 27.3719 | -81.40122 | P. Moler | Lake Wales |

**Table 2.**