**Raw data belonging to:**

**Beck et al. (2021) Are Palmer’s elm-leaf goldenrod and the smooth elm-leaf goldenrod real? The Angiosperms353 kit provides within-species signal in *Solidago ulmifolia* s.l.**

**Details regarding the 41 morphological characters measured.**

INFHT- inflorescence height: distance from bottom of inflorescence to tip of terminal inflorescence branch

LVS- number of leaves: number of cauline leaves below the inflorescence

ULFADSURPUB- upper leaf adaxial surface pubescence: count of hairs (excluding those on midvein or major secondary veins) on adaxial surface of upper leaf (ca. 40 mm2 area)

ULFABVPUB- upper leaf abaxial vein pubescence: count of hairs along 5 mm of upper leaf midvein

ULFABSURPUB- upper leaf abaxial surface pubescence: count of hairs (excluding those on midvein or major secondary veins) on abaxial surface of upper leaf (ca. 40 mm2 area)

MLFADSURPUB- middle leaf adaxial surface pubescence: count of hairs (excluding those on midvein or major secondary veins) on adaxial surface of middle leaf (ca. 40 mm2 area)

MLFABVPUB- middle leaf abaxial vein pubescence: count of hairs along 5 mm of middle leaf midvein

MLFABSURPUB- middle leaf abaxial surface pubescence: count of hairs (excluding those on midvein or major secondary veins) on abaxial surface of middle leaf (ca. 40 mm2 area)

USTEMPUB- upper stem pubescence: count of hairs along "slope and side" (excluding the top of the stem where hairs are often rubbed off) of a 3mm length of the upper stem

MSTEMPUB- middle stem pubescence: count of hairs along "slope and side" (excluding the top of the stem where hairs are often rubbed off) of a 3mm length of the middle stem

LSTEMPUB- lower stem pubescence: count of hairs along "slope and side" (excluding the top of the stem where hairs are often rubbed off) of a 3mm length of the lower stem

INV- involucre height: distance from the capitulum base to the end of the longest phyllary

RFLOR- number or ray florets

DFLOR- number of disc florets

ULFLEN\_AVG- upper leaf length: length of upper cauline leaf (average of two leaves)

ULFWD\_AVG- upper leaf width: width of upper cauline leaf (average of two leaves)

ULFSER\_AVG- upper leaf number of serrations: number of serrations along one side of upper cauline leaf (average of two leaves)

ULFSERRAT\_AVG- upper leaf serration ratio: ULFSER\_AVG\ ULFLEN\_AVG (average of two leaves)

ULFRAT\_AVG- upper leaf width/length ratio: ULFWD\_AVG/ ULFLEN\_AVG (average of two leaves)

ULFWD2TIP\_AVG- upper leaf width to tip: distance from widest point on upper leaf to leaf tip (average of two leaves)

ULFWD2TIPRAT\_AVG- upper leaf width to tip/length ratio:

ULFWD2TIP\_AVG/ULFLEN\_AVG (average of two leaves)

MLFLEN\_AVG- middle leaf length: length of middle cauline leaf (average of two leaves)

MLFWD\_AVG- middle leaf width: width of middle cauline leaf (average of two leaves)

MLFSER\_AVG- middle leaf number of serrations: number of serrations along one side of middle cauline leaf (average of two leaves)

MLFSERRAT\_AVG- middle leaf serration ratio: MLFSER\_AVG\ MLFLEN\_AVG (average of two leaves)

MLFRAT\_AVG- middle leaf width/length ratio: MLFWD\_AVG/ MLFLEN\_AVG (average of two leaves)

MLFWD2TIP\_AVG- middle leaf width to tip: distance from widest point on middle leaf to leaf tip (average of two leaves)

MLFWD2TIPRAT\_AVG- middle leaf width to tip/length ratio: MLFWD2TIP\_AVG/MLFLEN\_AVG (average of two leaves)

USTEMPUBLEN\_AVG- upper stem pubescence length: length of upper stem hair (average of five hairs)

USTEMPUBWD\_AVG- upper stem pubescence width: width of upper stem hair near hair base (average of five hairs)

PHYLEN\_AVG- phyllary length: length of inner phyllary (average of three phyllaries)

PHYWD\_AVG- phyllary width: width of inner phyllary (average of three phyllaries)

RCOR\_AVG- ray corolla length: length of total ray corolla (average of three rays)

RSTRLEN\_AVG- ray corolla strap length: length of ray strap (average of three rays)

RSTRWD\_AVG- ray corolla strap width: width of ray strap (average of three rays)

RPAP\_AVG- ray pappus length: length of ray pappus (average of three rays)

DCOR\_AVG- disc corolla length: length of total disc corolla (average of three discs)

DCORLOB\_AVG- disc corolla lobe length: length of disc corolla lobes (average of three discs)

DPAP\_AVG- disc pappus length: length of disc pappus (average of three discs)

DPAP\_RATIO- disc pappus/disc corolla length ratio: DPAP\_AVG/ DCOR\_AVG (average of three discs)

RPAP\_RATIO- ray pappus/ray corolla length ratio: RPAP\_AVG/ RCOR\_AVG (average of three rays)