**Table S1.** Morphological traits evaluated in nine chili peppers landraces from Yucatan Peninsula.

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| Variables | Score and Measurement technics |
| Quantitative | |
| Cotyledonous leaf length (cm) | Measured in fully developed cotyledons |
| Cotyledonous leaf width (cm) | Measured in fully developed cotyledons, at the widest point |
| Stem height (cm) | Measured when the first fruit begins to mature in 50% of the plants |
| Stem width (cm) | Measured after the first harvest, at the widest point |
| Stem length (cm) | Measured until the first bifurcation, immediately after the first harvest |
| Leaf length (cm) | Measured from the apex to the base of the leaf |
| Leaf width (cm) | Measured at the widest part of the leaf |
| Anther length (mm) | Measured immediately after anthesis |
| Filament length (mm) | Measured immediately after anthesis |
| Fruit length (cm) | Measured in mature fruits of the second harvest, from the union of the fruit with the pedicel to the fruit apex |
| Fruit width (cm) | Measured in mature fruits of the second harvest, at the widest point |
| Fruit weight (g) | Grams |
| Fruit pedicel length (cm) | Measured from the point of union of the pedicel with the fruit to the end of the pedicel |
| Fruit wall thickness (mm) | Measured in ripe fruit of the second harvest, at the widest point of the pericarp |
| Seed diameter (mm) | Measured at the widest point of the seed |
| Qualitative | |
| Hypocotyl color | Ordinal: 1 = white; 2 = green; 3 = purple |
| Hypocotyl pubescence | Ordinal: 3 = scarce; 5 = intermediate; 7 = dense |
| Cotyledon shape | Ordinal: 1 = deltoid; 2 = oval; 3 = lanceolate; 4 = elongated-deltoid |
| Stem color | Ordinal: 1 = green; 2 = green with purple stripes; 3 = purple; 4 = other |
| Nodal anthocyanin | Ordinal: 1 = green; 3 = light purple; 5 = purple; 7 = dark purple |
| Stem shape | Ordinal: 1 = cylindrical; 2 = angular; 3 = flattened |
| Stem pubescence | Ordinal: 3 = scarce; 5 = intermediate; 7 = dense |
| Growth habit | Ordinal: 3 = prostrate; 5 = intermediate; 7 = erect; 9 = other |
| Branching density | Ordinal: 3 = scarce; 5 = intermediate; 7 = dense |
| Tillering | Ordinal: 3 = scarce; 5 = intermediate; 7 = dense |
| Leaf density | Ordinal: 3 = scarce; 5 = intermediate; 7 = dense |
| Leaf color | Ordinal: 1 = yellow; 2 = light green; 3 = green; 4 = dark green; 5 = light purple; 6 = purple; 7 = variegated |
| Leaf shape | Ordinal: 1 = deltoid; 2 = oval; 3 = lanceolate |
| Leaf blade margin | Ordinal: 1 = integer; 2 = wavy; 3 = ciliate |
| Leaf pubescence | Ordinal: 3 = scarce; 5 = intermediate; 7 = dense |
| Number of flowers per axil | Ordinal: 1 = one; 2 = two; 3 = three or more; 4 = many flowers in clusters, but each one in an individual axil; 5 = other |

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| Table S1 continued |  |
| Variables | **Score and Measurement technics** |
| Flower position | Ordinal: 3 = pending; 5 = intermediate; 7 = erect |
| Corolla color | Ordinal: 1 = white; 2 = light yellow; 3 = yellow; 4 = yellow-green; 5 = purple with purple base; 6 = white with purple base; 7 = white with purple margin; 8 = purple |
| Corolla spot color | Ordinal: 1 = white; 2 = yellow; 3 = yellow-green; 4 = green; 5 = purple; 6 = other |
| Corolla length | Coded: 1 = <1.5; 2 = 1.5-2.5; 3 = >2.5 |
| Anther color | Ordinal: 1 = white; 2 = yellow; 3 = pale blue; 4 = blue; 5 = purple; 6 = other |
| Filament color | Ordinal: 1 = white; 2 = yellow; 3 = green; 4 = blue; 5 = light purple; 6 = purple; 7 = other |
| Stigma exertion | Ordinal: 3 = inserted; 5 = at the same level; 7 = exerted |
| Calyx margin | Ordinal: 1 = integral (smooth); 2 = intermediate; 3 = toothed; 4 = other |
| Fruit set | Ordinal: 3 = low; 5 = intermediate; 7 = high |
| Fruit color at the intermediate stage | Ordinal: 1 = white; 2 = yellow; 3 = green; 4 = orange; 5 = purple; 6 = dark purple; 7 = other |
| Fruit color at the mature stage | Ordinal: 1 = white; 2 = lemon-yellow; 3 = pale yellow-orange; 4 = yellow-orange; 5 = pale orange; 6 = orange; 7 = light red; 8 = red; 9 = dark red; 10 = purple; 11 = brown; 12 = black; 13 = other |
| Fruit shape | Ordinal: 1 = elongated; 2 = almost round; 3 = triangular; 4 = campanulate; 5 = blocky bell-shaped; 6 = other |
| Fruit shape at pedicel attachment | Ordinal: 1 = acute; 2 = obtuse; 3 = truncated; 4 = rounded; 5 = lobed |
| Fruit shape at blossom end | Ordinal: 1 = peak ; 2 = dull; 3 = sunken ; 4 = sunken and peak ; 5 = other |
| Fruit blossom end appendage | Ordinal: 0 = absent; 1 = present |
| Transverse fruit corrugation | Ordinal: 3 = slightly corrugated; 5 = intermediate; 7 = very corrugated |
| Number of locules | Numeric |
| Fruit surface | Ordinal: 1 = smooth; 2 = semi rough; 3 = rough |
| Pedicel attachment to fruit | Ordinal: 3 = deciduous; 5 = intermediate; 7 = persistent |
| Pedicel attachment to stem | Ordinal: 3 = deciduous; 5 = intermediate; 7 = persistent |
| Seed color | Ordinal: 1 = dark yellow; 2 = brown; 3 = black; 4 = other |
| Seed surface | Ordinal: 1 = smooth; 2 = rough; 3 = wrinkled |
| Seed size | Ordinal: 3 = small; 5 = intermediate; 7 = large |
| Number of seeds per fruit | Numeric |

**Table S2.** Results of principal component analysis (PCA), obtained with qualitative data of nine landraces of *Capsicum* spp., cultivated in the Yucatan Peninsula.

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| **Variable** | **Main components** | | | | | | | | | |
|  | PC1 | | | PC2 | | | PC3 | | PC4 | |
| Eigenvalue | 13.07 | | | 7.15 | | | 5.35 | | 4.58 | |
| Proportion of variance explained (%) | 33.51 | | | 18.34 | | | 13.73 | | 11.76 | |
| Proportion of cumulative variance (%) | 33.51 | | | 51.85 | | | 65.59 | | 77.35 | |
|  |  | | |  | | |  | |  | |
| Variables evaluated | | | Correlation values | | | | | | |
| Hypocotyl color | 0.226 | | | 0.529 | | | 0.488 | | -0.206 | |
| Hypocotyl pubescence | -0.820 | | | -0.024 | | | -0.316 | | 0.169 | |
| Cotyledon shape | 0.399 | | | -0.367 | | | 0.367 | | -0.664 | |
| Stem color | 0.430 | | | -0.019 | | | -0.297 | | -0.203 | |
| Nodal anthocyanin | 0.781 | | | 0.101 | | | -0.466 | | -0.027 | |
| Stem shape | 0.332 | | | -0.880 | | | 0.283 | | -0.078 | |
| Stem pubescence | 0.159 | | | -0.007 | | | 0.542 | | -0.285 | |
| Growth habit | 0.322 | | | -0.880 | | | 0.283 | | -0.078 | |
| Branching density | -0.627 | | | -0.607 | | | 0.415 | | 0.229 | |
| Tillering | -0.703 | | | -0.570 | | | -0.088 | | 0.294 | |
| Leaf density | -0.607 | | | -0.504 | | | 0.547 | | -0.088 | |
| Leaf color | 0.500 | | | -0.367 | | | -0.230 | | 0.653 | |
| Leaf shape | 0.344 | | | -0.170 | | | -0.172 | | 0.650 | |
| Leaf blade margin | -0.870 | | | 0.283 | | | -0.077 | | -0.328 | |
| Leaf pubescence | -0.456 | | | 0.128 | | | 0.660 | | 0.051 | |
| Number of flowers per axil | -0.322 | | | 0.880 | | | -0.283 | | 0.078 | |
| Flower position | -0.595 | | | 0.047 | | | -0.466 | | 0.129 | |
| Corolla color | -0.641 | | | 0.718 | | | -0.224 | | -0.110 | |
| Corolla spot color | -0.878 | | | 0.096 | | | -0.015 | | -0.379 | |
| Corolla length | 0.581 | | | 0.142 | | | 0.532 | | -0.083 | |
| Anther color | 0.205 | | | 0.395 | | | 0.203 | | -0.800 | |
| Filament color | -0.880 | | | 0.176 | | | -0.042 | | -0.360 | |
| Stigma exertion | -0.331 | | | 0.136 | | | 0.534 | | 0.239 | |
| Calyx margin | 0.376 | | | 0.397 | | | -0.334 | | -0.132 | |
| Fruit set | 0.624 | | | 0.026 | | | -0.662 | | -0.100 | |
| Fruit color at the mature stage | -0.315 | | | -0.181 | | | 0.703 | | 0.193 | |
| Fruit shape | -0.404 | | | 0.249 | | | 0.140 | | 0.778 | |
| Fruit shape at pedicel attachment | | 0.669 | | | 0.477 | 0.168 | | 0.346 | | |
| Fruit shape at blossom end | | -0.482 | | | 0.336 | 0.145 | | 0.585 | | |
| Fruit blossom end appendage | | 0.282 | | | 0.239 | 0.554 | | 0.363 | | |
| Fruit cross-sectional corrugation | | -0.031 | | | 0.846 | 0.205 | | 0.333 | | |
| Number of locules | | 0.325 | | | 0.572 | 0.652 | | 0.263 | | |
| Fruit surface | | -0.036 | | | 0.513 | 0.186 | | 0.147 | | |
| Pedicel attachment to fruit | | 0.850 | | | 0.371 | 0.133 | | -0.006 | | |
| Pedicel attachment to stem | | 0.560 | | | -0.180 | -0.138 | | -0.175 | | |
| Seed color | | 0.931 | | | -0.223 | 0.114 | | 0.200 | | |
| Seed surface | | -0.725 | | | 0.264 | 0.270 | | -0.491 | | |
| Seed size | | 0.850 | | | 0.344 | 0.319 | | -0.108 | | |
| Number of seeds per fruit | | 0.926 | | | 0.282 | 0.121 | | -0.185 | | |



**Figure S1.** Morphological traits of chili pepper landraces cultivated in Yucatan Peninsula, Mexico. 1) Bobo landrace; 2) Bolita landrace; 3) Dulce landrace; 4) Maax landrace; 5) Pico paloma landrace; 6) Rosita landrace; 7) Verde landrace; 8) Xcat’ik1 landrace; 9) Xcat’ik2 landrace. In all cases plant, flower, and fruit are a, b, and c, respectively.