

Table S1. Vegetation indices included in the analysis of quinoa hyperspectral data.

| Index | Name | Formula | Sensitivity | Reference |
|-------|--|--|-------------------------|----------------------------|
| ARI | Anthocyanin Reflectance index | $\frac{1}{R550} - \frac{1}{R700}$ | carotenoids | Gitelson et al. [50] |
| BGI | Blue Green pigment Index | $\frac{R450}{R550}$ | dry matter, pigments | Zarco-Tejada et al. [62] |
| BRI | Blue Red pigment Index | $\frac{R450}{R690}$ | dry matter, pigments | Zarco-Tejada et al. [62] |
| CRI | Carotenoid Reflectance Index | $\frac{1}{R510} - \frac{1}{R550}$ | carotenoids | Gitelson et al. [50] |
| CRI2 | Carotenoid Reflectance Index | $\frac{1}{R510} - \frac{1}{R700}$ | carotenoids | Gitelson et al. [50] |
| G | Greenness index | $\frac{R554}{R677}$ | chlorophyll | Zarco-Tejada et al. [62] |
| GM1 | Gitelson & Merzlyak index | $\frac{R750}{R550}$ | chlorophyll | Gitelson and Merzlyak [51] |
| GM2 | Gitelson & Merzlyak index | $\frac{R750}{R700}$ | chlorophyll | Gitelson and Merzlyak [51] |
| gNDVI | Green Normalized Difference Vegetation Index | $\frac{R750 - R550}{R750 + R550}$ | chlorophyll | Datt [46] |
| hNDVI | Hyperspectral Normalized Difference Vegetation Index | $\frac{R827 - R668}{R827 + R668}$ | structure | Oppelt [56] |
| LCI | Leaf Chlorophyll Index | $\frac{R850 - R710}{R850 - R680}$ | chlorophyll | Datt [45] |
| LIC1 | Lichtenthaler Index | $\frac{R800 - R680}{R800 + R680}$ | fluorescence | Lichtenthaler et al. [54] |
| LIC2 | Lichtenthaler Index | $\frac{R440}{R690}$ | fluorescence | Lichtenthaler et al. [54] |
| LIC3 | Lichtenthaler Index | $\frac{R440}{R740}$ | fluorescence | Lichtenthaler et al. [54] |
| MCARI | Modified Chlorophyll Absorption in Reflectance Index | $[(R700 - R670) - 0.2 (R700 - R550)] \left(\frac{R700}{R670} \right)$ | chlorophyll | Daughtry et al. [47] |

| Index | Name | Formula | Sensitivity | Reference |
|-----------------------------|--|--|----------------------|--|
| MCARI1 | Modified Chlorophyll Absorption in Reflectance Index | $1.2 [2.5 (R800 - R670) - 1.3 (R800 - R550)]$ | structure | Haboudane et al. [52] |
| MCARI2 | Modified Chlorophyll Absorption in Reflectance Index | $\frac{1.5 [2.5 (R800 - R670) - 1.3 (R800 - R550)]}{\sqrt{(2 R800 + 1)^2 - (6 R800 - 5 \sqrt{R680})}} - 0.5$ | structure | Haboudane et al. [52] |
| NDVI | Normalized Difference Vegetation Index | $\frac{NIR - RED}{NIR + RED}$ | structure | Rouse et al. [61] |
| NDVI _{Aparicio} | Normalized Difference Vegetation Index | $\frac{R900 - R680}{R900 + R680}$ | structure | Aparicio et al. [42] |
| NDVI _{Haboudane} | Normalized Difference Vegetation Index | $\frac{R800 - R670}{R800 + R670}$ | structure | Haboudane et al. [52] |
| NDVI _{ZarcoTejada} | Normalized Difference Vegetation Index | $\frac{R774 - R677}{R774 + R677}$ | structure | Zarco-Tejada and Miller [64] |
| NPCI | Normalized Pigment Chlorophyll Index | $\frac{R680 - R430}{R680 + R430}$ | dry matter, pigments | Peñuelas et al. [58] |
| PRI | Photochemical Reflectance Index | $\frac{R528 - R567}{R528 + R567}$ | chlorophyll | Gamon et al. [48] |
| PRI _{Penuelas} | Photochemical Reflectance Index | $\frac{R531 - R570}{R531 + R570}$ | chlorophyll | Peñuelas et al. [57] |
| PSSRa | Pigment Specific Simple Ratio for chlorophyll a | $\frac{R800}{R675}$ | chlorophyll | Blackburn [43] |
| PSSRb | Pigment Specific Simple Ratio for chlorophyll b | $\frac{R800}{R650}$ | chlorophyll | Blackburn [43] |
| PSSRc | Pigment Specific Simple Ratio for carotenoids | $\frac{R800}{R500}$ | carotenoids | Blackburn [43] |
| RDVI | Renormalized Difference Vegetation Index | $\frac{R800 - R670}{\sqrt{R800 + R670}}$ | structure | Roujean and Breon [60] |
| RGI | Red Green pigment Index | $\frac{R690}{R550}$ | dry matter, pigments | Zarco-Tejada et al. [62] |
| RGRI | Red Green Ratio Index | $\frac{RRED}{RGREEN}$ | structure | Rouse et al. [61]; Gamon and Surfus [49] |

| Index | Name | Formula | Sensitivity | Reference |
|----------|--|---|-------------|--------------------------|
| SIPI | Structure Insensitive Pigment Index | $\frac{R800 - R445}{R800 - R680}$ | pigments | Peñuelas et al. [57] |
| SR | Simple Ratio index | $\frac{RNIR}{RRED}$ | structure | Jordan [53] |
| SRChl | Simple Ratio index for Chlorophyll | $\frac{R672}{R550 \times R700}$ | chlorophyll | Datt [46] |
| SRChla | Simple Ratio index for Chlorophyll a | $\frac{R675}{R700}$ | chlorophyll | Datt [46] |
| SRChlb | Simple Ratio index for Chlorophyll b | $\frac{R675}{R650 \times R700}$ | chlorophyll | Datt [46] |
| SRChlb2 | Simple Ratio index for Chlorophyll b | $\frac{R672}{R708}$ | chlorophyll | Datt [46] |
| SRChltot | Simple Ratio index for total Chlorophyll | $\frac{R760}{R500}$ | chlorophyll | Datt [46] |
| TVI | Triangular Vegetation Index | $0.5 [120 (R750 - R550) - 200 (R670 - R550)]$ | chlorophyll | Broge and Leblanc [44] |
| WBI | Water Band Index | $\frac{R970}{R900}$ | water | Peñuelas et al. [59] |
| WCI | Water Content Index | $\frac{(R686 - R955)}{(R955 - R548)}$ | water | Mertens et al. [55] |
| ZTM | Zarco-Tejada & Miller | $\frac{R750}{R710}$ | chlorophyll | Zarco-Tejada et al. [63] |