Evaluation of candidate barcoding markers in *Orinus* (Poaceae)

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ABSTRACT. *Orinus* is an alpine endemic genus of Poaceae. Because of the imperfect specimens, high level of intraspecific morphological variability, and homoplasies of morphological characters, it is relatively difficult to delimitate species of *Orinus* by using morphology alone. To this end, the DNA barcoding has shown great potential in identifying species. The present study is the first attempt to test the feasibility of four proposed DNA barcoding markers (matK, rbcL, trnH-psbA, and ITS) in identifying four currently revised species of *Orinus* from the Qinghai-Tibetan Plateau (QTP). Among all the single-barcode candidates, the differentiation power was the highest for the nuclear internal transcribed spacer (ITS), while the chloroplast barcodes matK (M), rbcL (R), and trnH-psbA (H) could not identify the species. Meanwhile, the differentiation efficiency of the nuclear ITS (I) was

also higher than any two- or three-locus combination of chloroplast barcodes, or even a combination of ITS and any chloroplast barcode except H + I and R + I. All the combinations of chloroplast barcodes plus the nuclear ITS, H + I, and R + I differentiated the highest portion of species. The highest differentiation rate for the barcodes or barcode combinations examined here was 100% (H + I and R + I). In summary, this case study showed that the nuclear ITS region represents a more promising barcode than any maternally inherited chloroplast region or combination of chloroplast regions in differentiating *Orinus* species from the QTP. Moreover, combining the ITS region with chloroplast regions may improve the barcoding success rate.