

Weaving connections between the variation in pīngao colour and genetics throughout New Zealand

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Pīngao (*Ficinia spiralis*) is an endemic, sand-binding sedge that grows throughout the New Zealand coastline and is renowned for its brilliant yellow-orange colour. It is an integral part of the coastal ecosystem and has cultural and spiritual significance to Māori, being the only natural weaving material that has a colour that is never modified. However, pīngao populations around New Zealand are in decline due to coastal development, stock grazing, competition with invasive grasses, over-harvesting and human recreation. Pīngao varies dramatically around the country with respect to physical traits and growth patterns, and this appears to be genetically determined. We investigated the relationship between genetic variation and leaf colour pigment variation among pīngao populations from both the North and South Islands. Leaf samples were taken from ten populations and genotyped using microsatellites. The levels of chlorophyll A, chlorophyll B and carotenoids were extracted from mature, green leaves using acetone and analysed with a spectrophotometer. Relationships among dissimilarity in genetics, pigment profiles, other leaf traits and spatial location showed marked differences in pigment profiles among pīngao populations. These results have important implications for both the conservation and use of pīngao in weaving. Conservation managers must ensure seeds are eco-sourced to preserve the observed genotypic and phenotypic diversity and weavers could source leaves from different parts of the country to incorporate different shades of yellow and orange into their artwork.