



Molecular characterization of apomixis in *Cenchrus ciliaris* and its implication for improvement

September
15-17, 2021

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Introduction

- Buffel grass (*Cenchrus ciliaris*) is an important polymorphic apomictic forage grass grown worldwide for its forage quality and agronomic characteristics including high biomass yield, drought tolerance and adaptability to a wide range of soil conditions and agro-ecologies (Cook et al., 2020, Marshall et al., 2012)
- Breeding effort of buffel grass is hindered by the lack of information on the reproductive behaviours of the existing germplasm (Bashaw, 1962).
- Thus, generating information of the reproductive behaviour of buffel grass in the collection held in the International Livestock Research Institute (ILRI) Genebank would be useful for improvement and utilisation of this forage.



Materials and Methods

- 163 accessions were screened with diagnostic markers. Leaf samples of each accessions were collected from the field Genebank. DNA was extracted from freeze dried leaf samples using DNeasy Plant Mini Kit. The DNA samples were PCR screened using markers linked to genomic regions for apomictic and sexual modes of reproduction (Table 1).

Table 1. Primers used for screening the mode of reproduction of the buffelgrass collection

Primer code	Primer Sequence (5' to 3')	Remarks	Reference
P16RFP	CCAAGCTGCCATATCTCCATGCTC	Marker linked to apomixis	Ozias-Akins et al., 1998
P16RRP	ATCCGGGACATGCTGTGCGATTTC		
9HF	CCACTAGTGCTTCATTCTCC	SCAR marker for sexual reproduction	Yadav et al., 2012
9HR	AGTGTAACCAGACCGATGAC		

Results

- The reproductive nature of a buffel grass collection was characterized using markers linked to the apomixis sequence genomic region (ASGR) and a genomic region for sexual reproduction. The result showed that :
 - 155 accessions showed an amplification product for ASGR linked marker while they did not show a product for the SCAR marker. This indicates that these accessions have an obligate apomictic reproduction mode.
 - For six accessions, the PCR result showed amplification products for both ASGR and SCAR markers, indicating these accessions have a facultative apomictic reproduction mode.
 - No accession with an absolute sexual mode of reproduction was identified .
- The identified facultative lines could be used for developing 'absolute' sexually reproducing lines and contribute to the improvement of the crop.

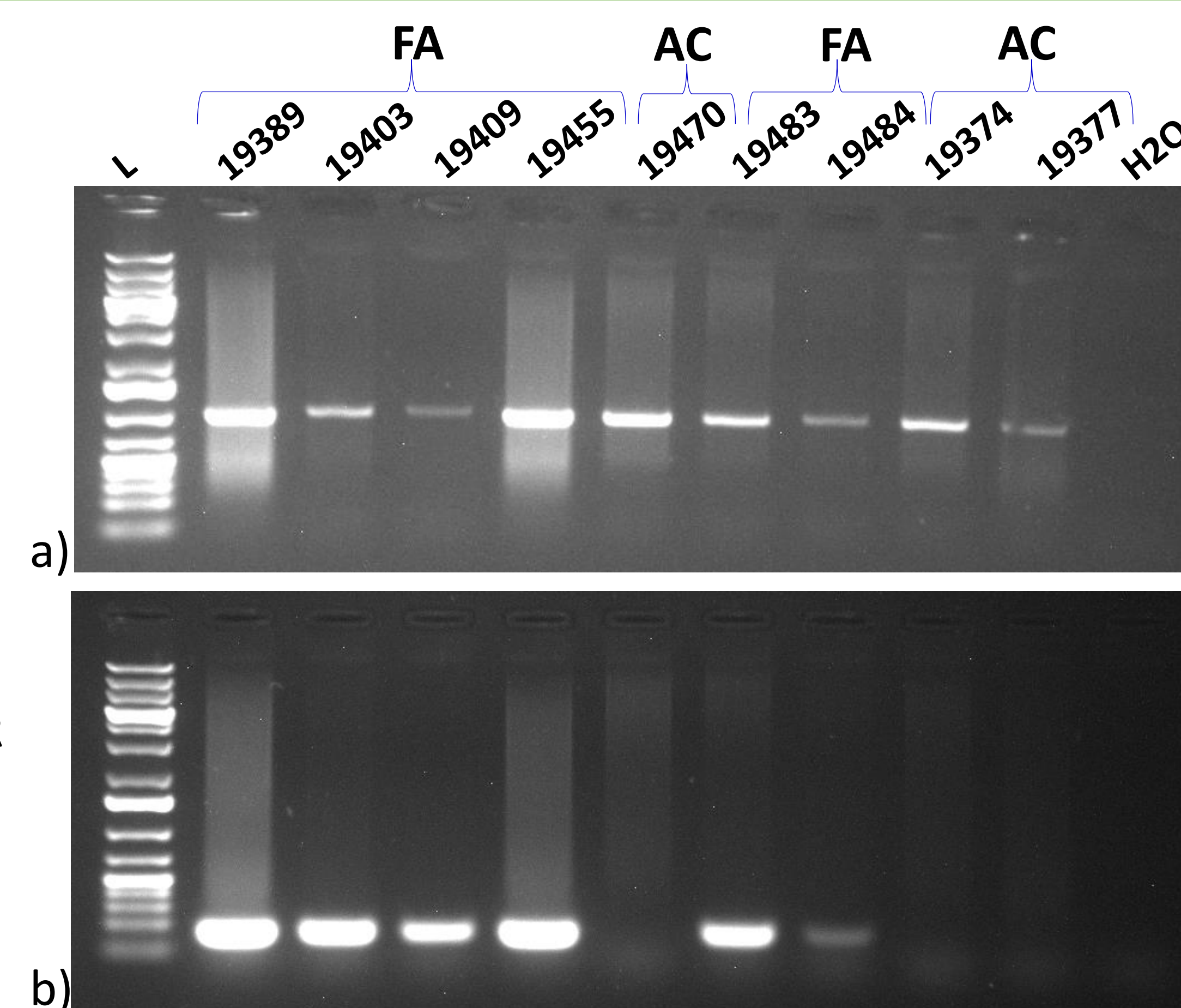


Figure 1. PCR result of a few accessions using: (a) the marker linked to the apomixis sequence genomic region and (b) the SCAR marker. L: 1 Kb Plus DNA ladder DNA; H2O= Water control; *FA= Facultative apomictic accessions; **AC: Apomictic accessions

Reference

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Date Year. September, 2021

