

# Development of co-dominant KASP markers co-segregating with Ug99 effective stem rust resistance gene *Sr26* in wheat

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**Abstract** Stem rust of wheat, caused by *Puccinia graminis* f. sp. *tritici* (Pgt), is a threat to global food security due to its ability to cause total crop failures. The Pgt race TTKSK (Ug99) and its derivatives detected in East Africa carry virulence for many resistance genes present in modern cultivars. However, stem rust resistance gene *Sr26* remains effective to all races of Pgt worldwide. *Sr26* is carried on the *Agropyron elongatum* (syn. *Thinopyrum ponticum*) segment 6Ae#1L translocated to chromosome 6AL of wheat. In this study,

a recombinant inbred line (RIL) population derived from a cross between the landrace Aus27969 and Avocet S, which carries *Sr26*, was used to develop co-dominant kompetitive allele-specific polymerase chain reaction (KASP) markers that co-segregate with *Sr26*. Four KASP markers (*sunKASP\_216*, *sunKASP\_218*, *sunKASP\_224* and *sunKASP\_225*) were also shown to co-segregate with *Sr26* in four additional RIL populations. When tested on Australian cultivars and breeding lines, these markers amplified alleles alternate to that linked with *Sr26* in all cultivars known to lack this gene and *Sr26*-linked alleles in cultivars and genotypes known to carry *Sr26*. Genotypes WA-1 and WA-1/3\*Yitpi carrying the shortest *Sr26* translocation segment were positive only for markers *sunKASP\_224* and *sunKASP\_225*. Our results suggest the four KASP markers are located on the original translocation and *sunKASP\_224* and *sunKASP\_225* are located on the shortened version. Therefore, *sunKASP\_224* and *sunKASP\_225* can be used for marker-assisted pyramiding of *Sr26* with other stem rust resistance genes to achieve durable resistance in wheat.

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Naeela Qureshi and Pakeerathan Kandiah contributed equally to this work.

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**Key message** This study reports co-dominant markers *sunKASP\_224* and *sunKASP\_225* located on the shortest translocated segment from *Thinopyrum ponticum* (6#AE) for Ug99 effective stem rust resistance gene *Sr26*.

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## Introduction

Wheat stem rust, caused by *Puccinia graminis* f. sp. *tritici* (Pgt), is one of the most devastating diseases worldwide. Severe stem rust epidemics have been