A Big Earth Data Platform for Three Poles

**Potassium transporter in ammopiptanthus mongolicus (2015-2016)**

1、Description

A typical Shaker type potassium ion absorption channel gene AmKAT1 was cloned from the leaves of Ammopiptanthus mongolicus.
Electrophysiological studies of AmKAT1 show that AmKAT1 is a K+ absorption channel regulated by potassium ion concentration. the system can only input K+ into guard cells when the extracellular potassium ion concentration is high (above 10 mmol/L). This distinctive feature has important physiological significance for xerophytes such as Ammopiptanthus mongolicus: under the condition of low concentration of extracellular potassium ions (no matter how high the concentration of sodium ions), AmKAT1 is difficult to open, potassium ions cannot enter guard cells, the guard cells will not absorb water and expand, and stomata will be difficult to open, thus reducing the transpiration and loss of water in Ammopiptanthus mongolicus and enhancing the viability of Ammopiptanthus mongolicus in arid environment. We have further studied the mechanism of extracellular potassium ion regulating the activity of AmKAT1 and found that at least two sites in AmKAT1 are involved in potassium ion induction, and now one site has been determined to be located in the channel pore region.
In addition, we cloned a guard cell export-oriented K+ channel AmGORK and a slow anion channel AmSLAC1. Fluorescence quantitative PCR results showed that AmGORK was mainly expressed in the upper part of the ground, and its transcription level was affected by PEG simulated water stress, ABA, NaCl and osmotic stress treatments to varying degrees. Electrophysiological studies in xenogeneic system of Xenopus laevis oocytes show that AmGORK channel of Mongolian Ammopiptanthus mongolicus guard cells can mediate efficient efflux of K+ when membrane potential is depolarized. The activation of this channel has typical voltage dependence and potassium ion concentration dependence, and is inhibited by potassium ion channel inhibitors TEA and Ba2+; In addition, the activity of AmGORK is regulated by extracellular pH, but not by extracellular calcium concentration. These results show that although Ammopiptanthus mongolicus is an ancient drought-resistant leguminous shrub originated millions of years ago, it is highly similar to the existing common model plant Arabidopsis thaliana in the stomatal closure mechanism dominated by K+. These results provide evidence to preliminarily reveal the functional conservatism of GORK-like stomatal regulatory channels in different species and long-term evolution.

2、Keywords

Theme：Vegetation,Biomass,Physiological indexes
Discipline：Terrestrial Surface
Places：Heihe River Basin
Time：2015-2016

3、Data details

1.Scale：None

2.Projection：None

3.Filesize：1.0MB

4.Data format：word

4、Space scope

|  |  |  |
| --- | --- | --- |
| - | north：42.47 | - |
| west：97.1 | - | east：106.52 |
| - | south：37.21 | - |

5、Time frame:2015-01-07 08:00:00+00:00--2017-01-06 19:59:59+00:00

6、Reference method

References to data:

SU Yanhua. Potassium transporter in ammopiptanthus mongolicus (2015-2016). A Big Earth Data Platform for Three Poles, doi:10.11888/Ecolo.tpdc.2708452017

References to articles:

7、Supporting project information

8、Data resource provider

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