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## Screening of Possesing Developed Nitrogen Use Efficiency Haplotype Germplasm in Rice

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### [Introduction]

The major greenhouse gasses in agronomic field are methane(CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O)and carbon dioxide(CO<sub>2</sub>). Especially in rice paddy, methane and nitrous oxide are main greenhouse gasses. In rice paddy, methane is emitted on anaerobic condition by methanogens. Emitted greenhous gasses are 2<sup>nd</sup> of agronomic field duing rice cultivation about 28.2%. Kim et al. (2019) repoted that when reduce 50% of nitrogen fertilization on paddy, greenhouse gasses were decreased about 11.3%. However, it is hard to encourage reduce fertilization to farmer because if reduce fertilization, rice yield is highly decreased. Therefore, this study screened germplasms using InDel markers and KASP markers having more efficient haplotype of nitrogen use efficieny genes which were already reported.

### [Materials and Methods]

Using reported genes that have mere efficient nitrogen use efficient haplotype, searched sequences using Rice genome annotation project and Oryzabase databases. Using searched physical position of SNPs, annotated on NCBI for match different cultivars which uploaded on database. Made KASP markers and InDel markers using that SNPs.

### [Results and Discussion]

*OsNGR5*(Wu et al. 2020), *OsAAP6*(Peng et al. 2014), *OsARE1*(Wang et al. 2018), *OsABC1*(Yang et al. 2016), *OsNPF6.1*(Tang et al. 2019) are already reported genes. *OsNGR5* is inducing tiller on low nitrogen condition, *OsAAP6* is increasing efficeincy of metabolism of amino acid. *OsNPF6.1* is increasing nitrate uptake efficiency. *OsARE1* and *OsABC1* are increasing efficient of GS/GOGAT cycle. Using KASP and InDel markers, screened germplams, there is no germplasm that is *OsNGR5*, 93-11 and IR46 has *OsAAP6* SNP, Milyang23 and IR46 have *OsARE1* SNP, Suweon664 and Ganzaoxian58 have *OsNPF6.1* SNP, Milyang 315, Milyang334, IR46 have *OsABC1* SNP. We expect that make mitigated greenhouse gasses rice variety by increasing nitrogen use efficiency and reducing fertiliation using this information

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