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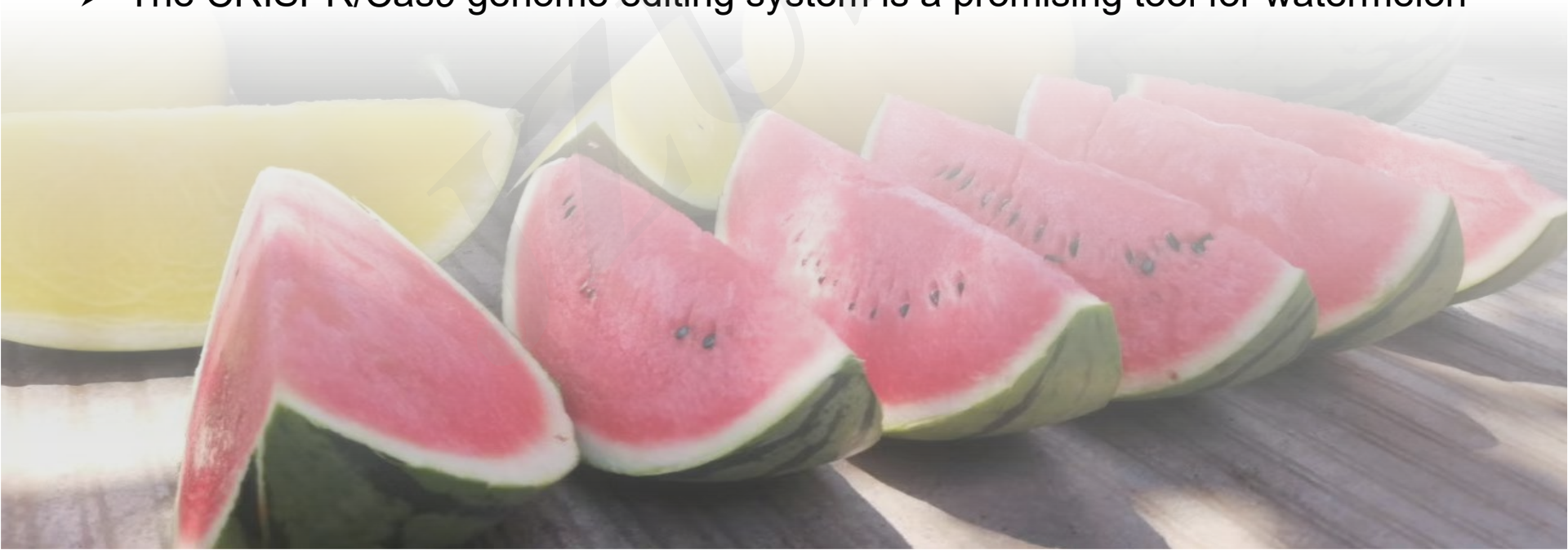
# Efficient genetic transformation and CRISPR/Cas9-mediated genome editing of watermelon assisted by genes encoding developmental regulators

**Key words:** Genetic transformation; developmental regulator; GRF5; watermelon; Cucurbitaceae; genome editing

# *Introduction*

**This Correspondence mainly focused on the establishment of efficient transformation and CRISPR/Cas9 genome editing systems in watermelon**

- Watermelon is economically important fruit crop
- Efficient transformation is the bottleneck for watermelon studies (usually ~1%)
- The CRISPR/Cas9 genome editing system is a promising tool for watermelon



# *Innovation points*

- ✓ ***AtGRF5* gives the highest transformation efficiency (24.73%) among the developmental regulators we tested.**

| Vector | DR gene(s) | Efficiency (%) |
|---|---|---|
| pW501 | - | 0.69 |
| **pW502** | ***AtGRF5*** | **24.73** |
| pW503 | *TaGRF4-OsGIF1* | 13.78 |
| pW504 | *ZmWUS* | 1.75 |
| pW505 | *ZmWUS* + *ZmBBM* | 22.1 |
| pW506 | *ZmWUS* + *ipt* | 0 |

| *Agrobacterium* strain | Number of explants | Positive transformants | Efficiency (%) |
|---|---|---|---|
| **GV3101** | **126** | **36** | **28.12** |
| EHA105 | 116 | 8 | 6.9 |
| LBA4404 | 76 | 0 | 0 |

- ✓ **GV3101 is the most appropriate *Agrobacterium* stain to deliver *AtGRF5***

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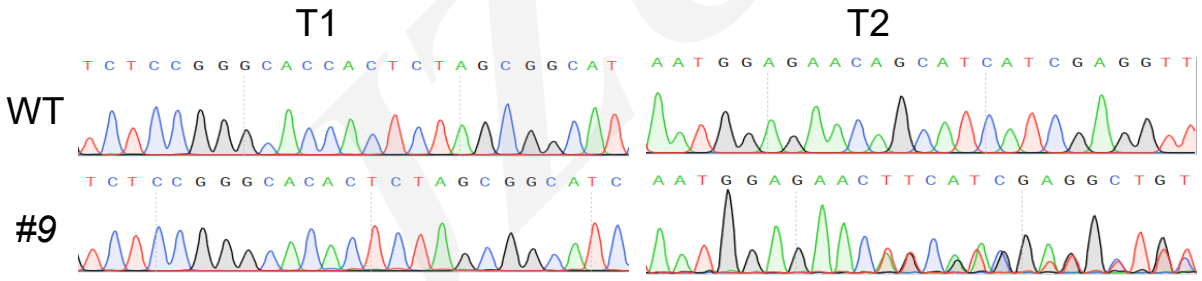
# *Innovation points*

- ✓ **AtGRF5 facilitated efficient genome editing of watermelon gene *ClPDS.***
- ✓ **Homozygous mutants were obtained in the T0 generation.**

| Target | Positive lines | Mutant plant | | Mutation efficiency |
|---|---|---|---|---|
| | | T1 | T2 | |
| *ClPDS* | 11 | 1 Homo (D1) | 2 Biallic (D2D5, D2D1 ); 1Hetro (D1) | 3/11 (27.30%) |



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