conferenceseries.com SciTechnol

J Plant Physiol Pathol 2017, 5:5
DOI: 10.4172/2329-955X-C1-012

3rd Global Summit on

Plant Science

August 07-09, 2017 | Rome, Italy

# How do salt glands develop and secrete salt in recretohalophytes? From structures to genes

**Fang Yuan, Zhongtao Feng, Yunquan Deng, Bingying Leng** and **Baoshan Wang**
Shandong Normal University, China

To survive in a saline environment, halophytes have evolved many strategies to resist salt stress. The salt glands of recretohalophytes are unique features for directly secreting salt out of a plant. Knowledge of the mechanisms of the development and salt secretion of salt glands may help us to change the salt-tolerance of crops and to cultivate the extensive saline lands that are available. Recently, ultrastructural studies of salt glands and the mechanism of development and salt secretion, particularly the candidate genes involved in the development and salt secretion, have been illustrated in detail. In this report, we summarize current researches on salt gland structure, salt development, secretion mechanism and candidate genes involved, and provide an overview of the development and salt secretion pathway of the salt gland. (1) Salt gland structure. To date, eleven families (65 species) have been discovered to have salt gland structures. The number of component cells has been used to separate multi-cellular salt gland and bi-cellular salt gland. Typical characteristics were identified in salt gland: the cuticles surrounding the salt gland, plasmodesmata between the mesophyll cells and the salt gland, and accumulated vesicles, which were considered to play a significant role in salt secretion combined with both apoplastic and symplastic transport. (2) Salt secretion mechanism. Three hypotheses of salt secretion were also supported by the recent studies: the role of the osmotic potential in salt secretion, a transfer system similar to liquid flow in animals and salt solution excretion by vesicles in the plasma membrane (exocytosis). In the last few years, more and more evidence has supported the third one. In addition, the membrane-bound translocating proteins are likely to be involved in salt secretion and these transporters mainly distributed asymmetrically in the other side of plasma membranes of salt gland cells adjacent to the collecting chamber. (3) Possible genes controlling salt secretion. As a typical recretohalophyte possessing salt glands, *Limonium bicolor* is a potential model plant for investigating the salt development and secretion mechanism by salt glands in the future. 102 genes high likely to be involved in salt secretion of *L. bicolor* have been screened by high-throughput RNA sequencing. The roles of these genes are being identified in our laboratory. (4) Salt gland development. In dicotyledons, leaf differentiation proceeds from the meristemoid mother cells (MMC) in distinct stages including stomata, epidermal cells and trichomes. It is proposed that salt gland also comes from MCC and then differentiated multicellular complex. Five distinct stages of leaf development has been observed based on epidermal structure developments such as salt gland in L. biocolor and RNA-sequencing to profile early leaf development using five distinct developmental stages was performed to look for the candidate genes controlling salt gland development. Twenty-six genes were proposed to participate in salt gland differentiation. For a decade, much progress has been made in molecular mechanism of the epidermal structure developments such as stomata and trichome in *Arabidopsis*. However, the in-depth mechanism of halophyte salt tolerance, in particular the molecular mechanism of salt gland development and secretion, is largely unknown. More and more scientists have begun to use halophytes as materials to study the salt tolerance mechanism.

bswang@sdnu.edu.cn