

Inheritance and Artificial Induction of Seedlessness in Grapes

Po-Yuan Chen¹

Abstract

Seedless grapes are favored by consumers for their convenience and are utilized for table grapes and raisins. The inheritance of seedless characteristic is complex. It has been demonstrated that *VvAGL11*, which belongs to the MADs-box family, is the gene responsible for seedlessness in stenospermocarpic grapes. Several molecular markers linked to the seedlessness in grapes have been developed. With the use of marker-assisted selection, the breeding program for seedless grapes can be conducted more efficiently. In addition to conventional crossbreeding with seedless parents, other methods such as bud sport and triploid breeding can be also applied to obtain new seedless cultivars. Although the probability of seedless characteristic being selected from bud sport is relatively low, the sport progenies usually maintain the desirable traits from their parents. Therefore, bud sport is still a useful way to obtain a new seedless variety. The seeds of triploid grapes tend to abort during development, because of high abnormalities in pollens and ovules. Hence, triploid grape breeding is a practical method to produce seedless grapes. However, the berry size of seedless grape is typically small, due to the lack of stimulations from endogenous plant hormones produced from seeds. Thus, to induce fruit set and berry development, it is necessary to exogenously apply plant growth regulators. The conventional breeding of new seedless grapes is time-consuming, leading to the development of techniques for artificial induction of seedlessness in seeded cultivars. Application of streptomycin and gibberellic acid (GA₃) before blooming can induce abnormalities in development of pollens and ovules, followed by GA₃ and forchlorfenuron (CPPU) treatments to promote fruit set and berry development. Thus, seedless berries can be produced in seeded grape varieties. Nevertheless, this method has some problems such as unstable seedlessness and rachis lignification. The optimal application times and concentrations of different plant growth regulators vary among cultivars.

Keywords: Seedless grape, Streptomycin, Gibberellic acid

¹ Assistant Researcher of Taitung DARES, MOA.