A Research Agenda for Early Life History Trait Study of Seeds of Native Species in Korea

Seung Youn Lee 1,2, Chung Ho Ko 3, Seun KIm 1, and Gyeongho Jang 1

1 Division of Horticulture & Medicinal Plant, Andong National University, Andong 36729, Korea,
2 Agricultural Science and Technology Research Institute, Andong National University, Andong 36729, Korea,
3 Division of Plant Resources, Korea National Arboretum, Yangpyeong 12519, Korea

Early life history trait-based studies of seeds have improved our understanding of diverse ecophysiological aspects of seed dormancy. However, a variety of questions remain due to the lack of understanding of the ecophysiology of native plant seeds. Recently many seed scientists have focused on the research fields of ecology, biogeography, and evolution of seed dormancy and germination. The main topic of the research fields is seed dormancy classification, after-ripening, soil seed bank, maternal effects, seed heteromorphism, dormancy cycling, and etc. However, few researches have been done about the topics of native species in Korea. Seed dormancy can be classified into five types: PD (physiological dormancy), MD (morphological dormancy), MPD (morphophysiological dormancy), PY (physical dormancy), and combinational dormancy (PD + MD). Among them, PD is the dominant dormancy type of seeds with fully developed embryo and is additionally divided into three types (non-deep, intermediate, and deep) depending on the dormancy breaking requirements such as cold stratification, dry after-ripening, and GA treatment. Recently the two subclasses (epicotyl and regular) of physiological dormancy have been newly classified. If shoot emergence is delayed 3—4 weeks or more after root emergence, then the seeds have physiological epicotyl dormancy. MPD is the type of combination of physiological dormancy and morphological dormancy. MPD has been classified into nine levels; 1) non-deep simple, 2) non-deep simple epicotyl, 3) intermediate simple, 4) deep simple, 5) deep simple epicotyl, 6) deep simple double, 7) non-deep complex, 8) intermediate complex, and 9) deep complex. The MD and MPD in seeds of Korean native species including Jeffersonia dubia, Adonis amurensis, Thalictrum uchiyamai, Ranunculus crucilobus, Trillium tobianum, and Pulsatilla tongkangensis have been identified. PY has also been classified into three types (Type-I, II, and III) depending on the water gap complex and the way the water gap opens. However, there have been no studies that identified water gap complex and the type of the PY in seeds of native species in Korea. In addition, no researchers have focused on seed maternal effects, dormancy cycling, and seed heteromorphism in plant species native to Korea. Seed ecophysiology studies can provide valuable information for physiology, propagation, cultivation, conservation, and restoration of native species. Therefore, more researches need to be done to understand the early life history with the seeds of Korean native plant species.

T. 054-820-5472, mrbig99@anu.ac.kr