

Comparison of phenology stages of wild rice species: *Oryza nivara* and *Oryza rufipogon* using *Ex-situ* common garden experiment

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Abstract

Common wild rice species, annual *O. nivara* and perennial *O. rufipogon* are closely related to Asian cultivated rice and progenitors of modern rice cultivars. Observations of phenology stages and their divergence were important to understand their life history patterns to select candidate parents for breeding purposes. An *Ex-situ* common garden experiment was conducted using seeds collected from two natural populations of each species. *O. nivara* seeds were collected from Kilinochchi and Vavuniya in the dry zone and *O. rufipogon* seeds were collected from Thihagoda and Seeduwa in the intermediate zone. Seedlings were transplanted for 30 individuals per population at the Faculty of Agriculture, University of Ruhuna. Life cycle observations were recorded for one year. The findings revealed that the highest survival rate belongs to *O. rufipogon* (85%, Thihagoda and 90%, Seeduwa) whereas, *O. nivara* showed a comparatively low survival rate (75%, Kilinochchi and 55%, Vavuniya). After 49 ± 13 days of transplanting, panicle emergence was appeared in *O. rufipogon* (Thihagoda) indicating the shortest vegetative stage while Seeduwa recorded 54 ± 17 . However, *O. nivara* (Vavunia) recorded the longest vegetative stage about 59 ± 2 days while Kilinochchi recorded 56 ± 3 days. Duration from Panicle emergence to 50% heading was comparatively low in *O. nivara* (15 days) than that of in *O. rufipogon* (25 days). The reproductive period of *O. nivara* (157 ± 13 days) seemed shorter compared to *O. rufipogon* (243 ± 19 days). Further, perennial *O. rufipogon* being a short vegetative period for 88 ± 11 days (Thihagoda) and also began next flowering period due to its bi-modal flowering nature. After reproductive stage, *O. nivara* no longer exists in the field owing to its annual nature. There were no clear differences in phenology stages among populations in respective species. Conclusively, both species showed nearly similar patterns of phenology stages. These findings may help to design successful breeding practices, germplasm collection and implementing conservation strategies of these valuable genetic resources.

Keywords: Life cycle, Life history traits, Species survival rate, Wild rice

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