



Describing morphological characters of seedlings of some dicotyledonous weeds for their identification and management

Ayan Das¹ and Parasuram Kamilya*

¹University of Calcutta, 35, Ballygaunge Circular Road, Kolkata, West Bengal 700019, India

*Department of Botany, Balurghat College, Balurghat, Dakshindinajpur, West Bengal 733101, India

*Email: pkamilya.in@gmail.com

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ABSTRACT

Seedling traits of 60 weeds under 24 families of Magnoliopsida have been studied in some crop fields of Dakshin Dinajpur district of West Bengal. Conservative seedling characters emphasize that the studied taxa may be enlisted in four artificial groups *i.e.*, Type I to IV, each having some families and/or genera. Artificial keys have been made for identification under field observations. The bearing of this study has also been addressed by comparing seedling data with other botanical disciplines. Peculiar juvenile behaviors like heteroblastic developments have also been observed. Seedling study is very much significant for eradication of weeds at juvenile stage before display of variable weeds in crop fields.

INTRODUCTION

Weeds are undesired plant species that grow with cultivated crops and intervene or compete with the crops for growth and nutrients and in this way affect the productivity leading to economic loss (Marwart *et al.* 2013). Most of the weeds are annual and complete their life cycle within a short period of time producing a large number of viable seeds that germinates immediately in almost every season to interact with crops. Therefore, rapid and accurate identification of weeds in seedling stage might be helpful for a successful weed management that can save both time and cost of production as well as lower chemical herbicide usage (Parkinson *et al.* 2013).

Importance of studying phenotypic traits of weed seedlings for their correct identification has a major role in suggesting suitable post-emergence herbicides for effective weed management. It is a common practice for the farmers in most parts of Eastern India that they use herbicides on mature weeds during pre or post harvesting period while abundant seeds have already been added by the weeds in the soil. Seeds protected by hard seed coats are not affected by the herbicides and they germinate into the next generation of weeds demanding proportional use of herbicides over the years. Hence, a strategy of weed management using herbicide or manual labor may be administered at the seedling stage *i.e.*, before flowering and fruiting to stop the next generation before it germinates. For this, weeds must be

identified at the seedling stage through proper keys constructed based of their juvenile traits of cotyledons or other parts, which are conservative and viable for weeds growing in any geological or ecological conditions and this process has already advocated by some workers (Parkinson *et al.* 2013, Chomas *et al.* 2001, Chancellor 1966).

MATERIALS AND METHODS

Thorough survey for collection of seeds and/or seedlings has been done from March, 2017 to February, 2018 in the crop fields located in different mouzas (administrative unit) of Balurghat block. The list of seedlings studied is given in **Table 1**. The taxa are arranged family wise after Takhtajan, 1997 and alphabetically with author's name(s), and photograph number within each family. The seedlings are collected in pre- and post-harvesting periods as well as growth stages of crops. The seeds are air-dried and sown in prepared seedbeds separately from time to time with proper tagging to raise seedlings in the experimental garden of Balurghat College. So-raised seedlings were compared to natural ones for proper identification. Few seedlings were also identified following literatures of Chancellor (1966), Chomas *et al.* (2001) and Parkinson *et al.* (2013). The seedlings were described with following Duke (1965), Burger (1972), de Vogel (1980), Paria *et al.* (1990, 2006), and Das and Kamilya (2014). Field photographs taken with Nikon digital camera of all the seedlings with highlighted paracotyledons and first two leaves have