GENERAL INTRODUCTION

Weeds are a threat to ecological balance and biodiversity throughout the globe (Callaway, 2002). They are also a serious threat to crops because of the phytochemicals they release into the rhizosphere by exudation from roots, bark and leaf litter that inhibit the growth of the cultivated crops (Muller, 1966). These chemical exudates from weeds are termed allelochemicals and their study is called allelopathy (Islam and Kato-Noguchi, 2013). Allelopathy refers to either the beneficial or harmful effect of one plant upon another, both crop and weed species, by the release of allelochemicals (Adler and Chase, 2007). Some prime features of allelopathy are that it involves interaction between plants only, animals are totally ruled out. Secondary metabolites play an important role in allelochemical formation. Allelophytochemicals released from plants influence the development and growth of its surrounding organisms in agricultural and biological systems. Allelochemicals are water soluble and may be retained in soil or are leached out with water affecting ambient plants within that seral stage, by a complicated type mechanism which may involve the interaction of different classes of naturally occuring chemicals like benzoic and cinnamic acid derivatives flavonoids, alkaloids, steroids, terpenoids, sesquiterpene lactones, etc. (Inderjit and Dakshini, 1998). Admixture of allelochemicals sometimes produce enhanced effect than an individual compound alone (allelosynergism). Reports are available that allelochemicals have indefinite target site in physiological pathways and there uncommon modes of action like synthetically produced herbicides (Khanh *et al.*, 2007). Keeping in conformity with the global context an enormous number of weeds have become endemic in India and consequently West Bengal which has affected the distribution and diversity of native plant species to a huge extent. The present allelopathic study therefore aims to know the

allelopathic effect of three such profuse growing weeds of West Bengal *viz Desmostachya bipinnata* L. Stapf (Poaceae), *Parthenium hysterophorus* L. (Asteraceae) and *Alternanthera sessilis* L. R. Br. *ex* DC. (Amaranthaceae). They are selected because of their vigorous ability to grow, outcompeting other species, easy availability and better response towards test plant materials. The seeds of *Vigna radiata* (L.) R. Wilczek (Fabaceae) and weed species *Senna occidentalis* L. (Fabaceae) are chosen as test species or bioassay materials. The results of action of allelochemicals from these weeds on the bioassay species can be considered at different layers of plant organization: physiological, biochemical, cytological and ecological (Reigosa *et al.*, 2006). This will enable us to understand weed-weed interaction in greater depths, establish a relative hierarchial order of allelopathic potential of the weeds and also enable us to know the aspects of dose and response relationships of allelochemicals on the test plant seeds, dependant on the extract and leachate concentrations. From an ecophysiological perspective *Senna occidentalis* has less allelopathic potential than the weeds taken for study. It grows rank and wild in nature, unlike crop plants like rice, wheat, black gram, green gram etc. which are more affected and easily vulnerable to replacement by different weeds and which are comparatively less allelopathic than *Senna*. Consolidated works on the allelopathic effects of weeds and the use of allelopathic plants for bio-herbicide development replacing conventional synthetic chemical herbicides are very few in weed management (Bhadoria, 2010). Allelopathy therefore in recent years has received National and International attention and importance.