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Herbicidal Potential of Red Spragle (*Leptochloa chinensis*) on Seed Germination and Seedling Growth against Some Tested Plants

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Abstract: The crude extracts from the stems of red spragle (*Leptochloa chinensis*) were extracted by ethyl acetate and used at six concentrations (0 0.5 1.0 1.5 2.0 and 2.5 g/L). The six concentrations of red spragle crude extracts were tested on the inhibitory on seed germination and seedling growth of seven tested plants (popping pod (*Ruellia tuberosa*, chinese cabbage (*Brassica chinensis*), chinese kale (*Brassica oleracea*), barnyard grass (*Echinochloa crus-galli*), amaranthus (*Amaranthus viridis*), weedy rice (*Oryza sativa*) and waxy corn (*Zea mays*). Inhibitory of five characteristics (seed germination, shoot length, root length, seedling fresh weight and seedling dry weight) were recorded. The results revealed that all crude extracts of red spragle (0.5 1.0 1.5 2.0 and 2.5 g/L concentrations) inhibited seed germination and seedling growth of seven tested plants for 9-100% inhibition. whereas, the red spragle crude extracts at 2.5 g/L concentration showed the completely excellent of inhibition (100% inhibition) of seed germination and seedling growth in term of shoot length, root length, seedling fresh weight and seedling dry weight characteristics against four tested plants (popping pod, chinese cabbage, chinese kale and amaranthus). The increasing of concentration of red spragle crude extracts showed increased of inhibition of seed germination and seedling growth in seven tested plants. This result displayed the herbicidal potential of red spragle (*L. chinensis*) against seven tested plants as well as suggested that the utilized of the crude extracts from the stem of red spragle (*L. chinensis*) as bioherbicides application in order to weed control.

Keywords: Herbicidal Potential, Crude Extracts, Red Spragle, *Leptochloa Chinensis*, Seed Germination, Seedling Growth, Allelopathic Activity

Introduction

Herbicidal potential is the mechanism of the interaction between life communities (the dornor plants as well as the receive plants) in environmental area (Sawatdikarn, 2009). Jrabran et al., (2015) demonstrated that various methods of herbicidal potential for allelopathic weed control, the allelopathic weed control divided in to five methods namely allelopathic cultivars, intercropping with allelopathic weed suppressing plants, allelopathic cover crops, allelopathic plant residues and inclusion of allelopathic crops rotation.

Nowaday, Modern of weed management is to decresing the utilization of harmful herbicides by using the biological management and application of allelopathic activity for weed management (Sawatdikarn et al., 2009). The allelochemical compound from some crops and weeds showed the herbicidal potential and allelopathic activity as well as the application of allelochemical compound as botanical herbicides in order to replace of the synthetic herbicides for weed management (Ma et al., 2020).

Several crops and weeds illustrated that the strong of the herbicidal potential as well as allelopathic activity, For example, Sawatdikarn (2010) marked that the crude extract from the seeds of three plant species namely tree basil (*Ocimum gratissimum*), celery (*Apium graveolens*) and dill (*Anethum graveolens*)) inhibited on seedling growth for 100% inhibition against purple nutsedge (*Cyperus rotundus*). Ferreira and Reinhardt (2010) conducted that the allelopathic effects of six selected plants (barley, canola, lupine, alfalfa, medic and ryegrass) against wheat.

Anitha and Gandhi (2012) summarized that the allelopathic effects of spinach (*Spinacia oleracea*) and *guava* (*Psidium guajava*) against mungbean (*Vigna radiata*). Al-Watban and Salama (2012) acted that the allelopathic activity of *Artemisia monosperma* on germination percentage against common bean (*Phaseolus vulgaris*). Zuo et al., (2012) showed that the allelopathic effects of wheat (*Triticum aestivum*) on seedling growth against patato (*Solanum toberosum*). Heidarzade and Esmaeili (2013) revealed that the allelopathic impact of yellow nutsedge (*Cyperus esculentus*) on seed germination and seedling growth against the three rice cultivars (Neda, Fajr and Shiroodi). Dadar et al., (2012) inferred that the allelopathic potential of purple nutsedge (*Cyperus rotundus*) on seed germination and seedling growth of tomato (*Lycopersicum esculentum*). Ahuja et al., (2015)

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showed that the herbicidal potential of clove (*Syzygium aromaticum*) against four selected weeds (*Ageratum conyzoides*, *Cassia occidentalis*, *Bidens pilosa* and *Commelina benghalensis*). Goyal (2017) abtracted that the allelopathic impact of essential oil from *Melaleuca leucadendra* against three selected weeds (*Echinochloa crus-galli*, *Cyperus rotundus* and *Leptochloa chinensis*). Ayeni (2017) stated that the allelopathic potential of leaves from two selected plants (*Senna siamea* and *Pinus carribaea*) inhibited of the seed germination and seedling growth in *Euphorbia heterophylla*.

Bindumole (2018) comprehended that the allelopathic properties of aqueous leaf extract of *Euphorbia hirta* on seed germination and seedling growth in term of root elongation, shoot elongation, fresh weight of seedling and dry weight of seedling against three selected vegetable crops (*Abelmoschus esculantus*, *Vigna ungiculata* and *Cucumis sativus*). In addition, Shahrajabian et al., (2019) noted that the allelopathic activity from three parts (leaf stem and root) of rice (*Oryza sativa*) on seed germination and seedling growth in term of coleoptile weight, radicle weight, coleoptile length and radicle length against corn (*Zea mays*).

The incomplete of the information of herbicidal potential of stems crude extracts from (*L. chinensis*) caused to seed germination and seedling growth characteristics (seed germination, shoot length, root length, seedling fresh weight and seedling dry weight) against seven tested plants. Sawatdikarn (2017) aggregated that the allelopathic effects of ethanolic crude extracts from six members in Piper genus (*P. betle*, *P. longum*, *P. sarmentosum*, *P. nigrum*, *P. pendulispicum* as well as *P. retrofractum*) on seed germination and seedling growth against black gram (*Vigna mungo*).

The objective of this research was to study of the herbicidal potential of stems crude extracts from red spragle (*L. chinensis*) on the inhibitory of seed germination and seedling growth of seven tested plants namely popping pod (*R. tuberosa*), chinese cabbage (*B. chinensis*), chinese kale (*B. oleracea*), barnyard grass (*E. crus-galli*), amaranthus (*A. viridis*), weedy rice (*O. sativa*) and waxy corn (*Z. mays*).

2. Materials and Methods

2.1 Location

This experiment was conducted at Department of Applied Science, Faculty of Science and Technology, Phranakhon Si Ayutthaya Rajabhat University, Phranakhon Si Ayutthaya province, Thailand during 2019-2020.

The eight tested plants in this study namely red spragle (*L. chinensis*), popping pod (*R. tuberosa*), chinese cabbage (*B. chinensis*), chinese kale (*B. oleracea*), barnyard grass (*E. crus-galli*), amaranthus (*A. viridis*), weedy rice (*O. sativa*) and waxy corn (*Z. mays*) were collected from the Agricultural fields for five locations (Bangban, Wangnoi Uthai Bangpa-in and Bangsai) in Phranakhon Si Ayutthaya Province (14° 21/N, 100°34/E), Thailand, during January-March, in 2019.

2.2 Preparation of extracts

The preparation of extracts**;** The fresh stems of red sprgle (*L. chinensis*) were chopped into 0.5 cm long pieces (Sawatdikarn, 2010). The components of fresh stem of red sprgle (*L. chinensis*) were then over dried at 80°C. for 3-5 days and then were ground into powder. One hundred grams of each dried material was extracted with ethyl acetate treatment for 48 h at 25°C. (Sawatdikarn, 2020). The plants extracts were respectively filtered through four layers of cheesecloth and centrifuged at 3,000 rpm for 5 h. These extractions were distilled several times by filter papers. Fresh stock extracts were kept in a chamber set at 5°C. until use.
The bioassay was conducted with six concentrations (0 0.5 1.0 1.5 2.0 and 2.5 g dry weight equivalent extract/L) of red sprgle (*L. chinensis*) crude extracts.

2.3 Seed bioassay

Seed germination tests and seedling growth tests were conducted for seven tested plants namely popping pod (*R. tuberosa*, chinese cabbage (*B. chinensis*), chinese kale (*B. oleracea*), barnyard grass (*E. crus-galli*), amaranthus (*A. viridis*), weedy rice (*O. sativa*) and waxy corn (*Z. mays*); 25 seeds were surface sterilized with 5% (w/v) sodium hypochlorite solution for 10 min, rinsed two times with distilled water. 25 seeds of seven test plants (popping pod (*R. tuberosa*, chinese cabbage (*B. chinensis*), chinese kale (*B. oleracea*), barnyard grass (*E. crus-galli*), amaranthus (*A. viridis*), weedy rice (*O. sativa*) and waxy corn (*Z. mays*)) were put on two layer filter paper in 12 cm. petri dishes (Sawatdikarn, 2020). The seed bioassay was divided into six concentrations (0 0.5 1.0 1.5 2.0 and 2.0 g dry weight equivalent extract/L) of red sprgle (*L. chinensis*) crude extracts.

Seed germination tests were tested follow by ISTA (2003) as well as seedling growth tests were tested follow by AOSA (2002). The petri dishes were tested in the darkness at 25 °C. The seed germination was measured at 5 days after incubation in darkness at 25 °C. (AOSA, 2002). The shoot and root length of seedling was measured at 7 days after incubation in darkness at 25 °C. (AOSA, 2002). The control seeds were tested on the filter paper moistened with the water solution (without the extract). The bioassay was repeated four times with ten plants of each treatment. The parameter of seed germination and seedling growth divided into five characteristics including seed germination, shoot length, root length seedling fresh weight and seedling dry weight.

The seed germination and seedling growth inhibition

(M) with respect to the control treament was calculated from the formula (Sawatdikarn, 2020) as follows **;**

M = [(A-B) / A] x100

Where A is the seed germination and seedling growth of the control treament and B is the seed germination and seedling growth of the treated of crude extracts.

2.4 Statistical analysis

All experiments were tested for four replications. Data of five characteristics (inhibitory of seed germination, inhibitory of shoot length, inhibitory of root length, inhibitory of seedling fresh weight and inhibitory of seedling dry weight) of seven tested plants namely popping pod (*R. tuberosa*), chinese cabbage (*B. chinensis*), chinese kale (*B. oleracea*), barnyard grass (*E. crus-galli*), amaranthus (*A. viridis*), weedy rice (*O. sativa*) and waxy corn (*Z. mays*) were subjected to analysis using Duncan 's Multiple Range Tests (DMRT).

Results and discussion

The crude extracts of red spragle (*L. chinensis*) at different concentrations (0.5 1.0 1.5 2.0 and 2.5 g/L) exhibited that the inhibition on seed germination and seedling growth in term of shoot length, root length seedling fresh weight and seedling dry weight of seven tested plants namely popping pod (*R. tuberosa*), chinese cabbage (*B. chinensis*), chinese kale (*B. oleracea*), barnyard grass (*E. crus-galli*), amaranthus (*A. viridis*), weedy rice (*O. sativa*) and waxy corn (*Z. mays*) ranged from 9% to 100 % inhibition (Figure 1).

The incresing of concentrations of red spragle crude extract showed the incresed of inhibition on seed germination and seedling growth in term of shoot length, root length seedling fresh weight and seedling dry weight in seven tested plants (Figure 1). Similarly, Sawatdikarn (2009) noted that the high concentration of red spragle (*L. chinensis*) resulted the increasing the inhibition on seed germination and seedling growth against six tested plants (cucumber, watermelon, pumpkin, alyceclover, wild spider and pigweed).

The impact of crude extract of red spragle (*L. chinensis*) against popping pod (*R. tuberosa*) ; The crude extracts from the stems of red spragle at all concentrations (0.5 1.0 1.5 2.0 and 2.5 g/L) inhibited of seed germination and seedling growth (shoot length, root length seedling fresh weight and seedling dry weight in popping pod for 9-100 % inhibition (Figure 1A). The incresing of concentrations of red spragle crude extract showed the incresed of inhibition on seed germination and seedling growth of popping pod. The red spragle crude extracts at 2.5 g/L concentration showed that the awfully amazing inhibition (100% inhibition) of seed germination and seedling growth in term of shoot length, root length, seedling fresh weight and seedling dry weight characteristics against popping pod.

In the same way, the allelopathic impact of red spragle (*L. chinensis*) crude extracts were also reported by Sawatdikarn (2009) showed that the allelopathic impact of the crude extract from red spragle (*L. chinensis*) inhibited of seed germination and seedling growth in term of shoot length, root length and seedling dry weight characters against alyceclover (*Alycicarpus vaginalis*).

Besides, Sawadikarn et al. (2009) impressed that the allelopathic activity of crude extracts of red spragle (*L. chinensis*) inhibited on seed germination and seedling growth against two tested plants namely hamta (*Stylosanthes hamata*) as well as calvacade (*Centrosema pascuorum*).

The stems of red spragle (*L. chinensis*) contained the allelochemical subatances as the organic acids which known that the allelopathic effects showed the reduction of seed germination and reduction of seedling growth against four tested plants (rice, chinese cabbage, giant mimosa and barnyard grass) (Sawadikarm and Rungprom, 2008).

The impact of crude extract of red spragle against chinese cabbage (*B. chinensis*); The crude extracts of red spragle at all concentrations (0.5 1.0 1.5 2.0 and 2.5 g/L) inhibited of seed germination and seedling growth (shoot length, root length seedling fresh weight and seedling dry weight of chinese cabbage ranged from 15 % to 100 % inhibition (Figure 1B). The red spragle crude extracts at 2.5 g/L concentration exhibited that the completely perfect inhibition (100% inhibition) of seed germination and seedling growth (shoot length, root length, seedling fresh weight and seedling dry weight) against chinese cabbage.

These data impressed that the allelopathic potential of crude extracts of red spragle against chinese cabbage. Similarly, Sawadikarm and Rungprom (2008) noted that the allelopathic effects of the ethyl acetate extracts of red spragle (*L. chinensis*) inhibited on seedling growth in term of shoot length and root length against chinese cabbage (*B. chinensis*).

The impact of crude extract of red spragle against chinese kale (*B. oleracea*); The crude extracts of red spragle at all concentrations (0.5 1.0 1.5 2.0 and 2.5 g/L) showed inhibition on seed germination and seedling growth in term of shoot length, root length seedling fresh weight and seedling dry weight against chinese kale for 13-100 % inhibition (Figure 1C). The red spragle crude extracts at 2.5 g/L concentration showed that the totally awesome inhibition (100% inhibition) of seed germination and seedling growth in term of shoot length, root length, seedling fresh weight and seedling dry weight characteristics against chinese kale.

The data is agreement with the experiment of Sawadikarn et al. (2008) who showed that the

allelopathic activity of ethyl acetate extracts of red spragle (*L. chinensis*) inhibited on seed germination and seedling growth in term of shoot length, root length and seedling dry weight against lettuce (*Lactuca sativa*). In addition, Sawadikarn et al. (2009) noted that the allelopathic potential of ethyl acetate extracts of red spragle (*L. chinensis*) inhibited on seed germination and seedling growth against two tested plants (*Centrosema pubescens* and *Macroptilium atropurpureum*).

These data showed the strongest of the allelopathic activity from ethyl acetate extracts of red spragle against chinese kale.

The impact of crude extract of red spragle against barnyard grass (*E. crus-galli*) ; The crude extracts of red spragle at all concentrations (0.5 1.0 1.5 2.0 and 2.5 g/L) exhibited the inhibition on seed germination and seedling growth in term of shoot length, root length seedling fresh weight and seedling dry weight against barnyard grass ranged from 15 to 85% inhibition (Figure 1D). The red spragle crude extracts for 2.5 g/L concentration showed that the highest inhibition of seed germination and seedling growth in term of shoot length, root length, seedling fresh weight and seedling dry weight characteristics for 75-85% inhibition against barnyard grass. The red spragle crude extracts at 0.5 g/L concentration showed that the lowest inhibition of seed germination and seedling growth in term of shoot length, root length, seedling fresh weight and seedling dry weight characteristics for 9-31% inhibition against barnyard grass.

This results exhibited that the allelopathic property of red spragle crude extracts against barnyard grass. This data is consistent with the researchs of Sawadikarm and Rungprom (2008) who posted that the allelopathic impact of the ethyl acetate extracts of red spragle (*L. chinensis*) inhibited on seedling growth in term of shoot length and root length against barnyard grass (*Echinochloa crus-gali*).

The secondary metabolites compounds from stems of red spragle crude extracts contained alkaloids compound and organic acids, these phytochemical compound showed the allelopathic activity (Sawadikarn, 2009).

The impact of crude extract of red spragle against amaranthus (*A. viridis*); The crude extracts of red spragle at all concentrations (0.5 1.0 1.5 2.0 and 2.5 g/L) showed that the inhibition on seed germination and seedling growth in term of shoot length, root length seedling fresh weight and seedling dry weight against amaranthus ranged from 11% to 100% inhibition (Figure 1E).

The red spragle crude extracts at 2.5 g/L concentration exhibited that the awfully excellent inhibition (100% inhibition) of seed germination and seedling growth in term of shoot length, root length, seedling fresh weight and seedling dry weight characteristics against amaranthus.

These data exhibited the allelopathic effects of crude extract of red spragle against amaranthus (*A. viridis*). This result agree with the research of Sawadikarm et al. (2008) who presented that the allelopathic impact of the ethyl acetate extracts of red spragle (*L. chinensis*) inhibited on seed germination and seedling growth in term of shoot length root length as well as seedling dry weight against *Brassica campestris*.

The impact of crude extract of red spragle against weedy rice (*O. sativa*) ; The crude extracts of red spragle at all concentrations (0.5 1.0 1.5 2.0 and 2.5 g/L) gave the inhibition on seed germination and seedling growth (shoot length, root length seedling fresh weight and seedling dry weight) against weedy rice ranged from 11 % to 86% inhibition (Figure 1F).

The red spragle crude extracts at 2.5 g/L concentration showed that the highest inhibition of seed germination and seedling growth in term of shoot length, root length, seedling fresh weight and seedling dry weight characters for 69-86% inhibition against weedy rice. The red spragle crude extracts at 0.5 g/L concentration gave the lowest inhibition of seed germination and seedling growth in term of shoot length, root length, seedling fresh weight and seedling dry weight characters for 11-16% inhibition against weedy rice (Figure 1F).

This study showed the allelopathic effects of red spragle crude extracts against weedy rice. The results are in agreement with some experiments, Sawatdikarn et al. (2008) who showed that the allelopathic impact of the ethyl acetate extracts of red spragle (*L. chinensis*) inhibited on seed germination and seedling growth in term of shoot length root length as well as seedling dry weight against lettuce *(Lactuca sativa)*. Similarly, Sawadikarm and Rungprom (2008) who exhibited that the allelopathic property of the ethyl acetate extracts of red spragle (*L. chinensis*) inhibited on seedling growth in term of shoot length and root length against rice (*Oryza sativa*).

The phytochemical compounds from stems of red spragle (*L. chinensis*) contained alkaloids compound and organic acids, these phytochemical compound showed the allelopathic effects (Sawadikarn et al., 2008).

The impact of crude extract of red spragle against waxy corn (*Z. mays*) ; The crude extracts of red spragle at all concentrations (0.5 1.0 1.5 2.0 and 2.5 g/L) exhibited the inhibition on seed germination and seedling growth (shoot length, root length seedling fresh weight and seedling dry weight) against waxy corn for 9-88 % inhibition (Figure 1G).

The red spragle crude extract at 0.5 g/L concentration exhibited that the weakest inhibition of seed germination and seedling growth for 4-20%

inhibition against waxy corn. The red spragle crude extract at 2.5 g/L concentration showed that the strongest inhibition of seed germination and seedling growth for 70-88% inhibition against waxy corn (Figure 1G).

The red spragle crude extracts showed the allelopathic activity against waxy corn. This results agreement with the results of Sawadikarn (2009) who presented that the allelopathic activity of the ethyl acetate extracts of red spragle (*L. chinensis*) inhibited on seedling growth in term of shoot length and root length against three tested plants (*Alycicarpus vaginalis*, *Cleome viscosa* and *Portulaca oleracea*).

The allelochemical substances from stems of red spragle (*L. chinensis*) contained alkaloids compound (Sawadikarn, 2009) and organic acids (Sawadikarn and Rungprom, 2008). These allelochemical substances (alkaloids compound as well as organic acids) showed the allelopathic activity.

The botanical toxic effects and allelopathic impact from the stems of red spragle (*L. chinensis*) showed the inhibitory of seed germination and seedling growth (seed germination and seedling growth in term of shoot length, root length seedling fresh weight and seedling dry weight characteristics) against seven tested plants (popping pod (*R. tuberosa*), chinese cabbage (*B. chinensis*), chinese kale (*B. oleracea*), barnyard grass (*E. crus-galli*), amaranthus (*A. viridis*), weedy rice (*O. sativa*) and waxy corn (*Z. mays*).

These results have been confirmed by some researches that present of allelopathic activity of red spragle (*L. chinensis*) crude extracts against some tested plants, For examples, Sawadikarn et al. (2008) who showed that the allelopathic activity of ethyl acetate extracts of red spragle (*L. chinensis*) inhibited on seed germination and seedling growth in term of shoot length, root length and seedling dry weight against lettuce (*Lactuca sativa*) as well as Sawadikarn et al. (2009) who noted that the allelopathic potential of ethyl acetate extracts of red spragle (*L. chinensis*) inhibited on seed germination and seedling growth against two tested plants (*Centrosema pubescens* and *Macroptilium atropurpureum*). In addition, Sawadikarn (2009) who impressed that the allelopathic activity of the ethyl acetate extracts of red spragle (*L. chinensis*) inhibited on seedling growth in term of shoot length and root length against two tested plants (cucumber and pumpkin).

These result presented that the ethyl acetate crude extracts in red spragle (*L. chinensis*) showed the allelopathic property and exhibited the inhibition on seed germination and seedling growth against seven tested plants namely popping pod (*R. tuberosa*), chinese cabbage (*B. chinensis*), chinese kale (*B. oleracea*), barnyard grass (*E. crus-galli*), amaranthus (*A. viridis*), weedy rice (*O. sativa*) and waxy corn (*Z. mays*) divided into two groups upon efficacy of the control against some tested plants, 1) the completely perfect (100 % inhibition) on seed germination and seedling growth against four tested plants (popping pod, chinese cabbage, chinese kale and amaranthus) as well as 2) the weak of crude extracts of red spragle (*L. chinensis*) against three tested plants, these groups showed the inhibition of seed germination and seedling growth ranged from 9-88% inhibition (the weak of inhibition) for three tested plants (barnyard grass weedy rice and waxy corn).

Sawatdikarn (2009) iterated that the allelopathic effects of the crude extracts from the stems of red spragle (*L. chinensis*) and showed the allelopathic property against three tested plants (*Alycicarpus vaginalis*, *Cleome viscosa* and *Portulaca oleracea*), the allelopathic effects of red spragle (*L. chinensis*) caused seedling growth retardation in term of shoot length, root length and seedling dry weight. The crude extracts of red spragle (*L. chinensis*) showed the reduction of seedling growth characters (presented the reduction of shoot length, exhibited the reduction of root length as well as showed the reduction of seedling dry weight).

These result displayed that the allelopathic potential of ethyl acetate crude extracts in red spragle (*L. chinensis*) as well as showed the completely awesome (100% inhibition) and exhibited the strongest of inhibition on seed germination and seedling growth against the four tested plants (popping pod, chinese cabbage, chinese kale and amaranthus).
These finding exhibited that the allelopathic impact of ethyl acetate crude extracts in red spragle (*L. chinensis*) is the newest application as bioherbicides had exploited for biological method for weed management.

Conclusion

This research showed the herbicidal potential of red spragle (*L. chinensis*) against seven tested plants. All crude extracts of red spragle (0.5 1.0 1.5 2.0 and 2.5 g/L concentrations) inhibited seed germination and seedling growth of seven tested plants for 9-100% inhibition. In addition, the red spragle crude extracts at 2.5 g/L concentration showed the completely excellent of inhibition (100% inhibition) of seed germination and seedling growth in term of shoot length, root length, seedling fresh weight and seedling dry weight characteristics against four tested plants (popping pod, chinese cabbage, chinese kale and amaranthus). The increasing of concentration of red sprgle crude extracts showed increased of inhibition of seed germination and seedling growth in seven tested plants. These result summarized that the crude extracts of red spragle (*L. chinensis*) showed the absolutely awesome (100% inhibition) of allelopathic activity and exhibited the strongest of inhibition on seed germination and seedling growth against the four tested plants (popping pod, chinese cabbage, chinese kale and amaranthus).

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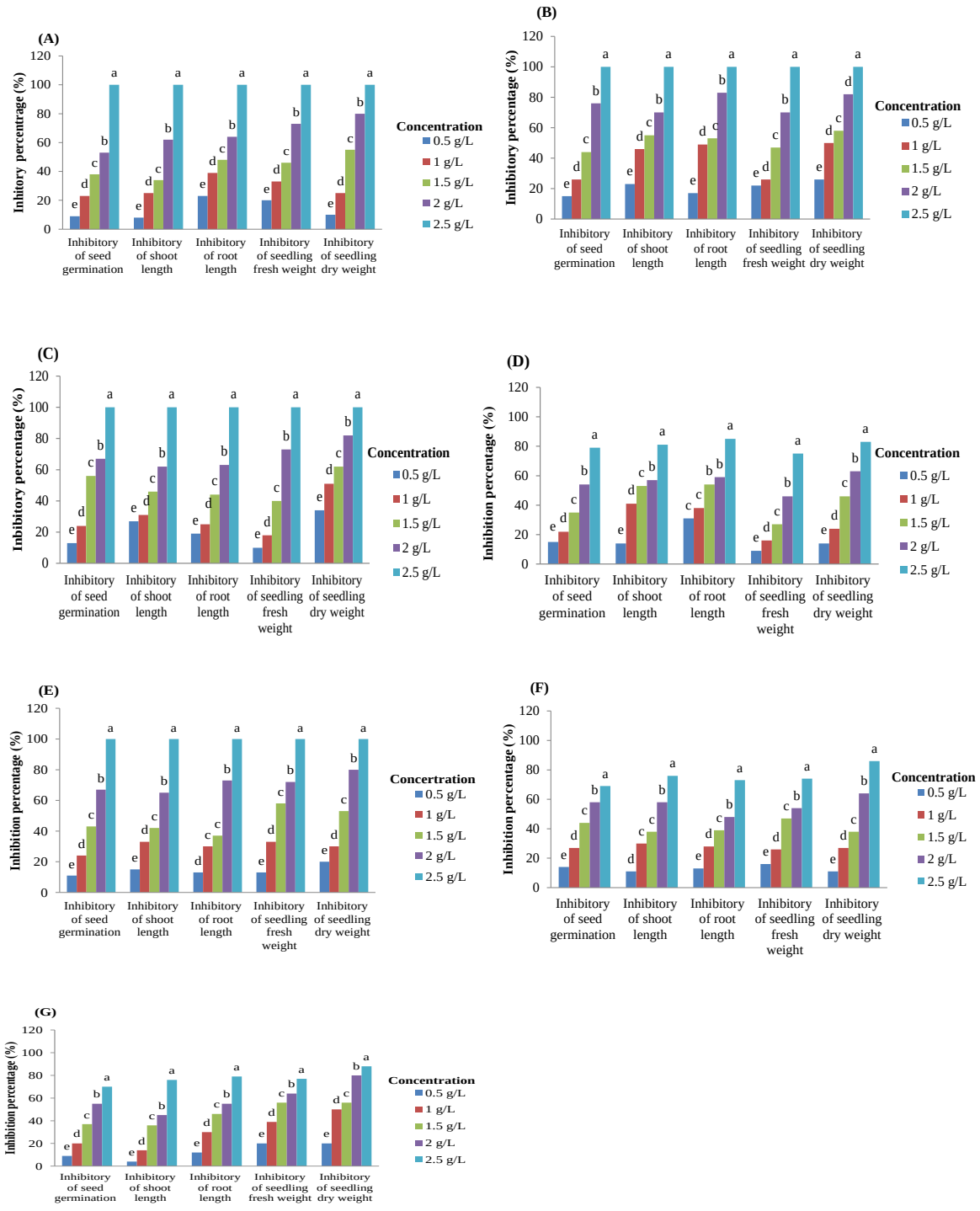

Figure 1. Inhibitory percentages of seed germination, shoot length, root length, seedling fresh weight and seedling dry weight against seven tested plants namely popping pod (A) chinese cabbage (B) chinese kale (C) barnyard grass (D) amaranthus (E) weedy rice (F) and waxy corn (G) as affected by different concentration of *Leptochloa chinensis* crude extracts. Values with different letter show significant difference ($p<0.05$) as determined by Duncan's Muntiple Range Test (DMRT).