International Journal of Farming and Allied Sciences
Available online at www.ijfas.com
©2017 IJFAS Journal-2017-6-6/146-148/31 Dec, 2017
ISSN 2322-4134 ©2017 IJFAS

Introduce of oxalis as antifeedant against larvae of moth

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ABSTRACT: The leaf eating caterpillar is known as current pest in garden. A winter moth (Plusia gamma L.) is able to make severity damage in vegetable crops. In spite of pest, some plants like oxalis got less damage or remained safe. It could be possibly for the existence of the antifeedant material in these plants. Antifeedant material is a protecting system (related to secondary metabolites) in plant against herbivorous. To test this plant ability in oxalis, soluble of leaf and root prepared and used to control moth larvae activity. In this study observed that the pest under condition of root soluble treatment removed fast in contrast to leaf soluble of oxalis. Also using leaf extraction was somewhat useful to delete larvae. The current study showed the potential of oxalis that could be utilized to product bio-pesticide.

***Keywords*:** Oxalis, noctuid, antifeedant, soluble

INTRODUCTION

Oxalis is a genus of family Oxalidaceae (Lollar M et al., 2015). A very aggressive weed thrives all over the west in sun or shade. It spreads quickly by seed. Seedlings start out from a single top root, which soon develops into shallow, spreading, knitted root system (Brenzel, 1995). There is an evidence that oxalis contain about 7% or more potassium oxalate (Cianciolo et al., 2016). Scientists have recently reported that the Oxalis have special abilities like antibacterial and antifungal (Satish et al., 2007, Vasantha et al., 2012 and YallaReddy, 2012). The spread of supplying pesticides threaten the environment so applying the botanical insecticides would be more helpful. Some botanical extracts, such as rotenone and pyrethrum, both of which quickly degrade in the environment, were also used (Barnard, 2011). However, some scientific investigations have performed to present safe botanical pesticides. Botanical plant extracts such as neem interfere with an insect's metabolic processes (Vantine et al., 2003). Even reported applying antifeedant that affected on growth and development and moulting process which caused to form abnormal pupa in moth (Gabrielpaulraj, 2014). The known active plant-based antifeedants belong to groups like chromenes,polyacetylenes,saponins, quassinoids, cucurbitacins, cyclopropanoid acids, phenolics, alkaloids, various types of terpenes and their derivatives etc(koul 2008). Also reported oxalis contained wide ranges of phytochemical like flavonoids, tannins, phytosterols, phenol, glycosides (Srikanth et al., 2012). This study was conducted to find oxalis as antifeedant**.**

MATERIAL AND METHODS

This experiment performed in fall season (December 2017) in a garden in the Gilan province of Iran. The experiment included two groups of 15 larvae which managed to five containers with three larvae in it. In according to activity of winter moth, one of the widespread moths was selected (family: Noctuidae, genus: Plusia gamma L.). Three leaves of garden plant as the nourishment source was considered for per unit. The two factors were used including: treatment by injecting of root extraction and injected extraction of leaf of oxalis. The treatments used at early morning (continual to end of experiment) and two days later(expected time for beginning of the caterpillar

mortality), commenced to count the dead insect on containers and the observing booked to calculating data for statistics analysis by t test.

RESULTS AND DISCUSSION

In this study, the plant soluble of oxalis (leaf and root) used on moth larvae (Plusia gamma L.). At first step, larvae commenced to feed extreme, but after two days of applying oxalis treatment, some of them died and others (survived-caterpillar) continued to consume leaves which soaked in oxalis soluble. After that, the number of dead caterpillar increased. During experiment larvae became gradually weak and unwilling to feed (figure 1). The insect feeding deterrents may be perceived either by stimulation of specialized deterrent receptors or by distortion of the normal function of neurons, which perceive phagostimulating compounds (koul, 2008). The effect of antifeedant was apparent by touching corpse, so that the contents of body released simply (figure 1). Also in a search, the quality of antifeedant activity in insect owing to applying natural product was shown (Stevens et al., 2005). The larvae mortality perhaps related to oxalis effect on inhibiting feeding. The act of antifeedant on insect gut musculature, reducing motility and consequently suppressing feeding was reported (Carpinella et al., 2003). The result indicated a difference between root and leaf soluble (table 1). It seems root soluble of oxalis was an effective treatment on took caterpillar off. Also using leaf extraction was somewhat useful to delete larvae. In addition, it could be a successful way to reduce severity of population of caterpillar by starving larvae. So considering the role of antifeedant against pest to achieve sustainable agriculture system is necessary. The result of this search indicates that new approach to this weed.

Table1. The larvae mortality of applying root soluble (A), leaf soluble (B)

Days after applying treatment	Group A	Group B
2	3	1
3	5	2
4	7	3
5		4
6		3
7		2

α=0.05, degree of freedom=7, mean A=5, Mean B=2.5, variance=1.93, calculated t=2.543

$t > t_{\alpha, n_1+n_2-2}$

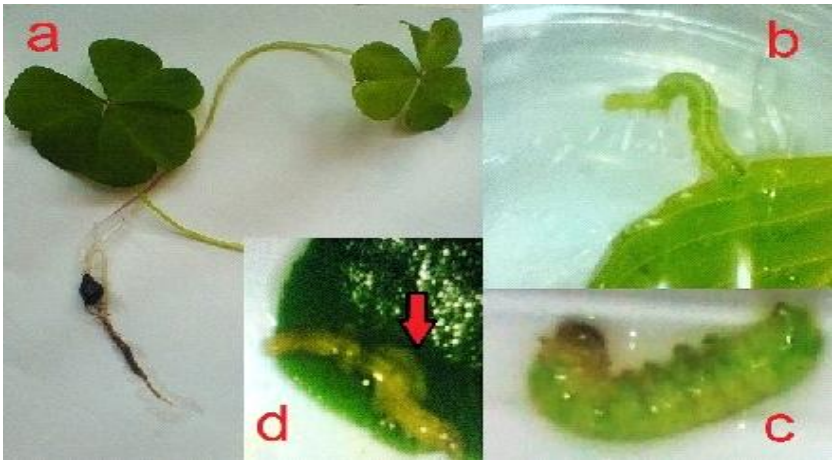

Figure1. Steps of test: shape a, oxalis plant. Shape b, Plusia gamma L. Shape c, unwilling to feed. Shape d, antifeedant effect (releasing liquid of Dead body only by once connect).

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