

EFFECT OF SEED QUALITY AND TRIFLURALIN ON THE GROWTH AND DEVELOPMENT OF PEANUTS

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Abstract

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Greenhouse studies were conducted using various procedures to reduce seed quality in order to determine if the peanut seed quality would influence the susceptibility of young seedlings to trifluralin injury. Seedlings that developed from seeds without a seed coat, or

from one half a seed with or without a seed coat were more susceptible to herbicide injury as compared to the plants developed from visibly sound seeds. The effects of various levels of trifluralin were found non-significant.

Introduction

Peanut or groundnut (*Arachis hypogaea*) L.) is an important crop of all the six continents. It is the second largest source of vegetable oil in the world. Herbicides are now mostly used for the control of weeds towards the objective of obtaining higher groundnut yields. Phytotoxicity of Herbicides are directly or indirectly affected by the environmental conditions such as soil type, rainfall, soil and atmosperic temperature, and soil moisture (2).

Teter and Miller (4) reported that injury to the radicle of peanut seed resulted in malformed plants and reduced stand. Effect of seed quality, systemic insecticides and trifluralin on cotton and spanish peanut were studied by Helmer *et al* (3). They reported that planting low quality seed resulted in a reduction in crop stand, growth and yield. Cargill and Santelmann (1), in their greenhouse and field studies, found that the peanut plants developed from seeds without a seed coat or from one half of a seed with and without seed coat were more susceptible to herbicide injury than plants from visibly sound seeds.

The present studies were conducted to find out the effect of seed quality and trifluralin on the growth and development of peanut seedlings.

Materials and Methods

The experiment was conducted in the greenhouse at the American University of Beirut, Lebanon during Spring, 1976. Banki, a bunch type peanut variety from Pakistan was tested in medium-sized plastic pots. The experiment was laid out in split plot design with four

replications keeping herbicidal treatments in the main plots. Trifluralin was applied at 0.5 and 1.0 kg/ha as pre-sowing treatments by spraying the herbicide on the soil in a stainless steel container, and then mixing the soil thoroughly after the application. The soil was then put in plastic pots.

Various seed coat removal treatments were tried to determine if they caused young peanut seedlings to become susceptible to injury from trifluralin. The following treatments were made to the normal sized «Banki» seed before sowing:

- a) Visibly sound-normal seed with a full seed coat.
- b) Onehalf of the seed coat removed.
- c) Seed coat totally removed
- d) One cotyledon and radicle with the seed coat present
- e) One cotyledon and radicle with the seed coat absent.

Five pre-germinated seeds were planted 1.5 to 2cm deep in the pots, and these were thinned to three plants per pot after emergence. The soil was washed away from the seedling roots after 15 days of emergence. Tops and roots of the seedlings were separated and oven-dried to record their dry weights. The data obtained were subjected to the analysis of variance using New Duncan's Multiple Range test.

Results and Discussion

The data regarding dry matter of tops and roots in peanut seedlings are presented in Table 1. The effect of trifluralin on plant tops, developed from whole seeds with or without seed coat 15 days after emergence, was found to be non-significant. Similarly no difference in weight tops was observed in the seedlings developed from visibly sound seed and seed coat partially or totally

removed when treated with or without trifluralin. Stunted growth was observed in the plants developed from split cotyledon with or without a seed coat, and the effect was more pronounced when the herbicide was applied at the higher rate. Top growth was generally greater in the seedlings developed from whole seed as compared to those from one half of a seed.

The root growth was significantly less in plants obtained from split cotyledon without seed coat as

compared to other seed coat removal treatments. The reduction in root development due to application of trifluralin though non-significant, was also observed. These findings are quite in accordance with the results already reported by Teter and Miller (4), Helmer *et al* (3) and Cargill and Santelmann (1), who concluded that the seed quality affected the plant growth and development as well as susceptibility to the herbicidal injury.

الملخص

شودري، ج.أ، س.أ. شودري، ون.م. شيما. ١٩٨٤. تأثير نوعية البذور والترافلورالين على نمو الفول السوداني. مجلة وقاية النبات العربية ٢: ١٠٣ - ١٠٥

بذرة مع أو بدون غطاء كانت أكثر حساسية لأذى مبيد الأعشاب بالمقارنة بالبادرات التي نمت من بذور جيدة. لقد تبين أيضاً أنه لم يكن هناك فرق معنوي بين تأثير تركيزات مختلفة من الترافلورالين.

لقد استعملت في البيوت الزجاجية طرق مختلفة للتقليل من نوعية البذور وذلك لدراسة ما إذا كانت نوعية بذور الفول السوداني لها تأثير على قدرتها لتحمل أذى الترافلورالين. ان البادرات التي نمت من بذور بدون غطاء للبذرة أو من نصف

Table 1. Effect of seed quality and trifluralin on the growth and development in peanut seedlings

| Trifluralin application (kg/ha) | seed coat removal treatments | dry weight (mg / 3 plants)* | |
|------------------------------------|------------------------------------|-----------------------------|-----------|
| | | tops | roots |
| 0 (Control) | Seed visibly sound. | 832 a | 281 bcd |
| | Seed coat partially removed. | 790 ab | 295 ab |
| | Seed coat totally removed. | 941 a | 374 a |
| | Split Cotyledon with seed coat. | 492 cde | 160 fg |
| | Split Cotyledon without seed coat. | 507 cde | 145 fg |
| | 0.5 | Seed visibly sound. | 948 a |
| Seed coat partially removed. | | 816 a | 234 cdefg |
| Seed coat totally removed | | 843 a | 235 cdefg |
| Split Cotyledon with seed coat. | | 515 cde | 167 efg |
| Split Cotyledon without seed coat. | | 544 bcd | 156 fg |
| 1.0 | | Seed visibly sound. | 920 a |
| | Seed coat partially removed. | 863 a | 231 cdefg |
| | seed coat totally removed. | 680 abc | 187 defg |
| | Split Cotyledon with seed coat | 511 cde | 141 fg |
| | Split Cotyledon without seed coat. | 426 cdel | 116 g |

* The figures sharing same letters are non-significant at 5% level of significance.

References

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