Reproduction of *Caloglyphus redikorzevi* Zach. (Acaridae) and Their Influence on Germination of Canola and Black Seeds

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ABSTRACT

Laboratory studies on the stored product mite *Caloglyphus redikorzevi* Zach. proved that it affected the germination of the Canola seeds (*Brassica napus*) and the Black seeds (*Nigella sativa*). Also, results showed that the propagation of the *C. redikorzevi* increased when fed on seeds of either plant, under laboratory conditions, reaching its maximum at the 5th week of the study then sharply declined thereafter.

Key Words: *Mites,* Acaridae, *Caloglyphus redikorzevi* Zach, *Brassica napus* , *Nigella sativa*, Germination**.**

INTRODUCTION

Some astigmatic mite species are economically important stored product pests, infesting stored grains, seeds, and other food and feed stored commodities. (Thind & Clarke 2001, Kucerova *et al*., 2003, Kucerova & Horak, 2004, Safar, 2005 and Palyvos *et al.*, 2008). These pests negatively influence the quality of stored commodities, cause allergic reaction (Kondreddi *et al*., 2006) and disseminate toxic moulds (Hubert *et al*., 2004). Two mite species, *Tyrophagus putrescentiae* S. and *Rhizoglyphus echinopus* F. & R. are harmful as they attack different seeds, grains, chocolates and dry dates and cheese (El- Bolok *et al*., 1990 and Hoda *et al*., 1990).

Acarus siro L. and *T. putrescentiae* S. showed adverse effect on seed germination of maize, oats, wheat, beetroot, carrots, kohlrabi, lettuce, radish and spanish seeds stored for 3 or 6 months under ambient conditions of 20 ^{0}C and 75% RH.(Abd-Rabou, 2000). Therefore, the aim of the present work was to study the population development of *Caloglyphus redikorzevi* Zach. on Canola seeds *(Brassica napus)* and Black seeds *(Nigella sativa*) during 7 weeks storage and germination activity of both seeds.

MATERIALS AND METHODS

A-Mite culture:

Individuals of *C.redikorzevi* were separated from infested wheat samples by Tullgren funnel and placed in glass jars (4.5 cm.diameter & 18 cm height) containing pieces of wet bread with water and kept in the laboratory at average temperature 27ºC and RH 73%.

B- Biological studies:

Eighty rearing units (13mm. diameter & 7 mm height) for this mite were used and divided into 8 groups to study the development and the influence of the mite on seeds. Each unit contained 5 pairs of mite and 100 of Canola seeds or Black seeds. Mite population was observed for 7 weeks. Only one group was examined every week to record the number of eggs and moving stages.

Effect of the mite on seed germination:

After every week, one group of Canola seeds (10 units) were transferred to 10 Petri dishes (8 cm diameter & 2 cm height) which contained a thin layer of wetted cotton for germination. The previous technique was used with black seeds for germination.

RESULTS AND DISCUSSION

1-Propagation of the *C .redikorzevi* mite fed on Canola seeds:

After the 1st week, the number of eggs and moving stages averaged 35.7 and 31.7, respectively then increased to reach maximum average after the 5th week recording 220.7 eggs and 255.6 moving stages. After that, population then declined to 65.6 eggs and 92.6 individuals after the 7th week.

The mean total number of eggs and moving stages recorded 67.4 after the 1st week, then increased to reach a maximum mean number 462.3 after the 5th week then declined to 148.2 after 7th week (Table 1).

After the 1st week, % germination of seeds combined with the mite recorded 84.6 % then decreased gradually to reach 0% after the 7th week (Table 1).

2-Propagation of the *C.redikorzevi* mite fed on Black seeds:

After the 1st week (Table 2), the mean number of eggs and moving stages averaged 105.4 eggs and 93.6 moving stages then increased to reach 870.5

Table (1): Mean number of *C. redikorzevi* mite associated with Canola seeds (*Brassica napus*) and its germination after different periods at 27 ºC and R.H. 73%.

Weeks after	Different stages of mite			% Germination of seeds	
	Moving stages	eggs	Total	Control	Treatment
1st week	31.7±2.1	35.7±1.9	67.4±3.2	97.6±0.6	84.6±2.6
2nd week	43.5±2.3	48.7±1.5	92.3±2.5	97.7±1.3	79.2±2.1
3rd week	79.5±3.2	80.9±4.1	160.2±3.5	96.8±2.2	68.4±3.1
4th week	101.0±2.2	103.6±2.7	204.6±3.1	95.2±1.9	52.8±2.8
5th week	255.6±3.4	220.7±3.7	462.3±4.5	97.3±2.5	39.8±1.8
6th week	182.7±1.9	200.4±2.2	383.1±3.2	95.3±2.7	22.5±1.9
7th week	92.6±2.3	65.6±1.8	148.2±2.1	96.2±1.8	0.0±0.0

Table (2): Mean number of *C. redikorzevi* mite associated with Black seeds (*Nigella sativa*) and its germination after different periods at 27 ºC and R.H. 73%.

Weeks after	Different stages of mite			% Germination of seeds	
	Moving stages	Eggs	Total	Control	Treatment
1st week	93.6±2.1	105.4±2.4	199.00	97.3±2.2	72.33±2.4
2nd week	122.4±1.7	157.4±1.9	279.00	97.03±1.7	65.43±2.3
3rd week	240.2±1.2	280.3 ±1.6	520.50	96.23±3.1	41.73±2.2
4th week	680.7±2.4	720.1±3.1	1400.80	94.33±2.7	38.63±0.9
5th week	750.3±2.9	870.5±1.2	1620.80	95.43±3.1	21.53±0.8
6th week	425.6±2.2	590.4±2.3	1016.00	96.23±2.9	10.43±0.9
7th week	00±00	00±00	00.00	96.53±3.4	0.0±0.0

and 750.3 after the 5th week then declined to zero after the 7th week. The total mean of eggs and moving stages was 199.0 after the 1st week, then increased to reach a maximum mean number 1620.0 after the 5th week then declined to zero after the 7th week.

After the 1st week, % germination of seeds combined with the mite recorded 72.3 % compared with 97.3 % for the control. Germination percentage gradually decreased from the 2nd week to reach 10.4 % and zero after the 6th and 7th weeks, respectively (Table 2).

Finally, it could be concluded that population of the mite *C.redikorzevi* gradually increased to reach its maximum after the 5th week of the experiment averaging 870.5 and 220.7 moving stages and 750.3 and 255.6 eggs on Canola seeds and Black seeds, respectively. The populations then decreased to reach zero numbers after the 7th week. This could be attributed to crowding effect which decreased reproduction activity. This phenomenon obviously appeared after outbreaks. This is also supported by the findings of Zaher *et.al.* (1978) who found that *T.urticae* Koch (= *T.arabicus*, Attiah) population increased with increasing density to a maximum then decreased thereafter. Seed germination followed negative trend according to mite infestation. This may be attributed to that acarid mites in stores destroy the germ of seeds and grains and consumed very little of the remainder (Solomon, 1946).This destruction increased with mite numbers and occurance.

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