

053 - The influence of environmental conditions on the naturalization of the alien millipede species *Spinotarsus caboverdus* Pierrard, 1987 on Cape Verde

B Nascimento, H Sermann, C Büttner

Humboldt-Universität zu Berlin, Landwirtschaftlich-Gärtnerische Fakultät, Institut für Gartenbauwissenschaften, FG Phytomedizin, Lentzeallee 55-57, 14195 Berlin, Germany

Email: helga.sermann@agrar.hu-berlin.de

1. INTRODUCTION

Spinotarsus caboverdus belongs to the family Odontopygidae (Order Spirostreptidae). This family is widely spread across tropical Africa with the exception of Madagascar. The genus *Spinotarsus* was introduced to Cape Verde via the African continent (Brito, 1994). *S. caboverdus* was first found on Cape Verde in 1969 (Neves et al., 1993). Mechanical damage leads to losses in plant tissue and can be observed year-round. It is possible to distinguish border and hole feeding in leaves and holes bored in fruit.

2. MATERIAL AND METHODS

S. caboverdus was collected on Santo Antão and transferred to Germany. The millipedes were kept in small groups (15/treatment) in terrariums at temperatures of 20, 25, 30 and 35°C, relative humidity of 75% and 12 hours of illumination. Pieces of potato were included as food.

Sick and dead millipedes as well as excrement of potential predators were collected at several times of the year at several sites of the island Santo Antão.

3. RESULTS

The temperature on the islands Santo Antão fluctuated between 20 und 30 °C. Temperatures up to 30°C are favourable for the viability of females and males. The highest levels of egg laying were also attained at these levels (Table 1).

Table 1 Mortality of adults of *S. caboverdus*, number of eggs and number of hatched eggs after 30 days at temperature of 20, 25, 30 and 35°C and 75% humidity

Temperature	Mortality (%)		Eggs (number)	Hatched eggs (number)
	Females	Males		
20	10	0	33	31
25	10	0	35	29
30	40	70	60	39
35	100	100	6	0

The lifecycle of *S. caboverdus* is adapted to environmental parameters such as rainfall period. The egg laying period coincided with the rainfall period because eggs and the first three stadia of juveniles require high soil moisture.

Moreover, the millipedes have no effective antagonists. It was observed that habitats of millipedes and toads coincided close to irrigation channels; however, substantial utilization of millipedes by toads as a food source only occurred in summer, when toad populations peaked. Entomopathogenic fungi found on Santo Antão also do not show clear potential as antagonists (Table 2).

Table 2 Isolated fungi from adults and eggs of *S. caboverdus*

Stadium of <i>S. caboverdus</i>	Origin	Genus/species of fungi
Adult	Santo Antão	<i>Acremonium strictum</i> <i>Aspergillus</i> sp. <i>Cylindrocladium</i> sp. <i>Fusarium semitectum</i> <i>Geotrichum</i> sp. <i>Gliocladium</i> sp. <i>Paecilomyzes</i> sp.
Egg	Laboratory	<i>Doratomyces microsporus</i> <i>Penicilium</i> sp. <i>Trichurus spiralis</i>

However, only a few of the isolated fungi have been shown to be entomopathogenic to date.

4. CONCLUSION

It seems that no natural factors can stop population development.

- The millipedes can always find nourishment in fields planted with permanent crops like banana and sugarcane as well as in vegetable crops.
- Abiotic factors like temperature vary with small amplitudes (20-30°C) and don't have a negative influence on the reproduction and development of millipedes.
- There are no effective antagonists:
 - The population of toads remains limited in terms of time and space.
 - Potential entomopathogenic fungi found on Santo Antão do not show a clear function as antagonists.

6. REFERENCES

- Brito, M J, The millipede of Santo Antão, *Spinotarsus caboverdus*: survey for pathogenic microorganisms, bioassay tests of fungal pathogens against *S. caboverdus* and *Melanoplus sanguinipes*. – Thesis, Montana State University, Bozeman – Montana, USA, 1994
- Neves, A M, van Harten, A, McKillup, S C, The Millipede *Spinotarsus caboverdus* PIERRARD (Diplopoda, Odontopygidae), an Important Pest of Agricultural Crops on the Island of S. Antão. Courier Forschungs- Institut Senckenberg, 159, 1993, 327-334

