

**TRISETACUS CHAMAECYPARI SMITH  
(ACARI: PHYTOPTIDAE) DAMAGING LEYLAND  
CYPRESS IN BRITAIN: A NEW HOST AND  
COUNTRY RECORD FOR THIS MITE**

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ABSTRACT

The eriophyoid mite *Trisetacus chamaecypari* Smith was found for the first time in Britain on a hedge of Leyland Cypress ( $\times$  *Cupressocyparis leylandii*) in Cheshire. This find represents a new host and country record for this mite and it is the first eriophyoid species to be reported from  $\times$  *C. leylandii*.

INTRODUCTION

In September 2002, a Leyland Cypress hedge ( $\times$  *Cupressocyparis leylandii*) (Dallimore & Jackson) approximately 25 years old and growing in a private garden near Altrincham, Cheshire (SJ755878) was observed to have areas of dieback. Samples were forwarded by the owner to the Royal Horticultural Society (RHS) Garden at Wisley, where foliar damage, the main symptom, was identified as being caused by an aphid, *Cinara* sp. (Hemiptera: Lachnidae). During this examination several pale yellow eriophyoid mites were observed in association with some of the small dead vegetative buds at the shoot tips. The sample was forwarded to the Central Science Laboratory (CSL) where 32 live adult female specimens were removed, slide mounted in polyvinyl-lactophenol (Heinze, 1952) and identified as *Trisetacus chamaecypari* Smith (Phytoptidae), a first British and host record. The male of this species has been described (Smith, 1977) but none was found in this sample.

Three slides with a total of 11 specimens have been deposited in the collection of the NHM (Accession Number BMNH (E) 2003-62), one slide of four specimens is deposited in the Forestry Research Agency collection, Alice Holt, Hampshire and the remaining 17 specimens on three slides are retained at CSL (Ref. 20027326).

HOST PLANTS AND BIOLOGY

Most species of eriophyoid mite have a restricted host range, usually being found on a single plant species or group of closely related hosts within the same plant genus or family. In addition, infestations often result in the formation of characteristic host plant symptoms. The close host relationship and host symptoms are a helpful guide to identification prior to the examination of slide-mounted specimens.

The genus *Trisetacus* is currently represented by at least 56 species all of which inhabit gymnosperm hosts in the families Cupressaceae, Pinaceae and Taxodiaceae. *Trisetacus chamaecypari* was described from the cones of *Chamaecyparis nootkatensis* (Smith, 1977) and has since also been recorded from the cones and foliage of *Chamaecyparis lawsoniana*, *Chamaecyparis thyoides*, *Juniperus virginiana* and *Cupressus macrocarpa* (Smith, 1984). Finding *T. chamaecypari* inhabiting  $\times$  *C. leylandii* is not surprising because this host is a hybrid formed by a cross between *C. nootkatensis* and *C. macrocarpa*.

The biology of *T. chamaecypari* has not been investigated. Studies of some of the North American species of *Trisetacus* found that in those that inhabit fruiting bodies and vegetative buds, such as *T. chamaecypari*, the females migrate from the feeding sites in the autumn and hibernate in fresh parts of the plant (Smith, 1984). The following spring as new growth begins the females resume feeding and egg laying. The generation time from egg to adult takes 3–4 weeks, with the adults of both sexes apparently living for several weeks. The early summer generation then produces a second generation in the autumn to complete the cycle (Smith, 1984).

#### GEOGRAPHICAL DISTRIBUTION

Most of the known species of *Trisetacus* are Holarctic, being found in Europe and North America (Amrine & Stasny, 1994; 1996), the exceptions are: *T. abietivagrans* Kandon from Japan (Kandon, 1981), *T. calvus* Navia & Fletchmann from Brazil (Navia & Fletchmann, 2000), *T. taiwanensis* Huang from Taiwan (Huang, 2001) and *T. distinctus* Smith, a new country record in Taiwan (Huang & Boczek, 1996). *Trisetacus chamaecypari* was described from Canada (Smith, 1977) and is recorded from coastal British Columbia and southern Ontario, the USA (coastal Oregon, California and Pennsylvania) (Smith, 1984), and Britain, reported here.

Four species of *Trisetacus*, namely: *T. juniperinus* (Nalepa) and *T. quadrisetus* (Thomas) both on *Juniperus communis*; *T. laricis* (Tubeuft) on *Larix decidua*, and *T. pini* (Nalepa) on *Abies pectinata* and *Pinus sylvestris* have been recorded in Britain (Swanton, 1912; Bagnall & Harrison, 1928; Burkill, 1930; Turk, 1953). Smith (1984) rightly points out that no, or very incomplete, morphological descriptions exist for *T. quadrisetus*, *T. laricis* and *T. pini* thus making a definitive identification difficult. Most of the early eriophyid records were based solely on observations of host damage, i.e. 'distinctive' symptoms such as erineae, galls and leaf rolling and not by examination of slide-mounted mites, a practice that continues to this day particularly in amateur gall-recording circles. As a result it is rare to find any reference specimens that can be used to confirm these records. There were, for example, no specimens of *Trisetacus* deposited in the CSL or Forest Research Agency collections (C. Tilbury & S. Heritage, pers. comm. 2002) and no examples of *T. chamaecypari* in the Natural History Museum (NHM), London (A. S. Baker, pers. comm. 2002) prior to this find.

#### DETECTION AND IDENTIFICATION

Host symptoms indicating an infestation by *T. chamaecypari* are not obvious and required close observation. Infested terminal vegetative buds had turned brown and died. Dissection of these dead buds revealed the remains of old mite colonies and examination of the healthy foliage revealed the presence of the live mite in amongst the bases of the scale-like leaves. In life these mites are pale yellow, spindle-shaped and very small, the largest specimens being 275  $\mu\text{m}$  in length and therefore barely visible to the naked eye (Fig. 1a–d).

Members of the genus *Trisetacus* are easily separable from all other eriophyid genera by the presence of three setae on the prodorsal shield (two scapular and one anteriomedial) (Fig. 1a) and identification to genus can be made using Amrine (1996). At the present time there is no fully comprehensive key available to the species of *Trisetacus*. In his review of 22 North American species, Smith (1984) provided the following description of *T. chamaecypari*:

'Prodorsal shield 24–32  $\times$  37–49; admedial lines long; with depressed pit postero-medially; anteromedial shield setae long (2/5–1/2 as long as shield). Idiosoma of ♀ moderately long (250–275), of ♂ short (150–200). Opithosoma of ♀ with 63–75, of ♂

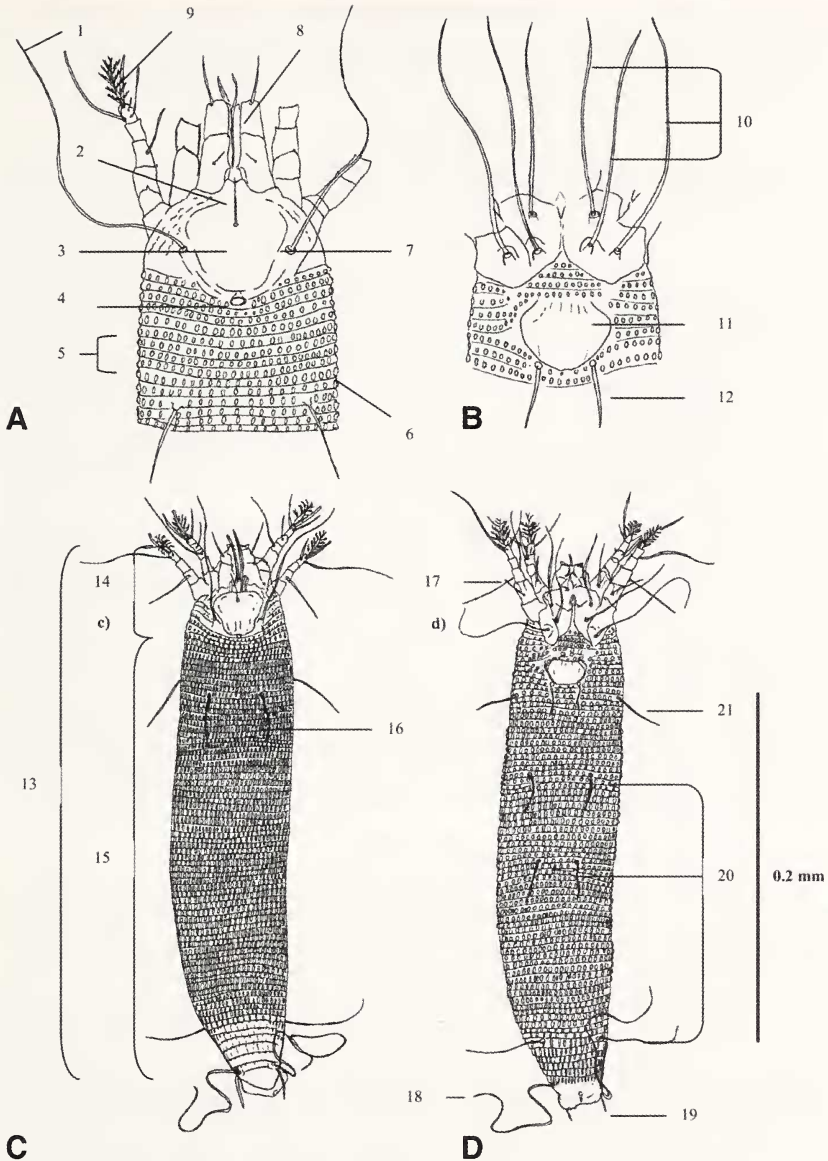


Fig. 1. *Trisetacus chamaecyperi* (female specimen).

A, dorsal prosoma – (1) scapular seta (2) anteriomedial seta (3) prodorsal shield (4) depressed pit (5) annuli (6) microtubercle (7) admedial line (8) pedipalps (9) empodial featherclaw.

B, coxo-genital region – (10) coxal setae (11) genital shield (12) genital seta.

C, dorsal aspect – (13) idiosoma (14) prosoma (15) opithosoma (16) dorsal seta.

D, ventral aspect – (17) ventral femoral seta (18) caudal seta (19) accessory seta (20) ventral setae (21) lateral seta.

A & B adapted from Smith (1984).

with 52–65 annuli; microtubercles elongate elliptical basally, dome-shaped and rounded apically. Pedipalps shorter than to as long as prodorsal shield (20–32). Empodial featherclaws with 6–8 rays. Femora II with ventral setae'. (all measurements in  $\mu\text{m}$ ).

#### ECONOMIC DAMAGE

Of the known *Trisetacus* species, five appear to be the most economically damaging, namely; *T. ehamanni* Keifer (Saunders & Harrigan, 1976), *T. campnodus* Keifer & Saunders (Keifer & Saunders, 1972) and *T. gemmavitiensis* Styler *et al.* (Styler *et al.*, 1972) on *Pinus sylvestris*; *T. juniperinus* (Castagnoli & Simoni, 1998; Roques *et al.*, 1999) on *Cupressus sempervirens* and *T. kirghisorum* Shevtchenko (Organezova & Pogosova, 1994) on *Juniperus polycarpus* and *Juniperus foetidissima*. Postner (1976) discusses the economic importance of the eriophyoid species known to occur on fir and spruce in Europe including data on *T. abietis* Postner, *T. grossmani* Keifer; *T. pini floricolus* Trotter and an unidentified *Trisetacus* species.

No bud or foliar symptoms have been reported due to the presence of *T. chamaecypari* on any of its recorded hosts. However, infestations in the cones of the type host *C. nootkatensis* have been reported to result in the destruction of a significant proportion of the seeds (Hunt, 1976).

The first seedlings of  $\times C. leylandii$  were discovered in south Wales in 1888 (Edlin, 1975) and since then eight cultivars have been developed. Being a vigorous and fast growing ornamental,  $\times C. leylandii$  has become commercially important in many parts of the world. It is planted extensively as hedging, used in shelter belts and is a popular garden ornamental in the United Kingdom. In New Zealand and Australia it is used in timber production and in the USA it is used as a 'Christmas tree'. The damage that *T. chamaecypari* may cause to  $\times C. leylandii$  has yet to be assessed in economic terms. It appears from the material examined that the damage caused is limited to some of the smaller terminal buds. All cultivars of  $\times C. leylandii$  are sterile and must be propagated by cuttings, so any potential damage to the flowers or cones that are occasionally produced is of lesser significance than the bud damage.

#### DISCUSSION

The population of *T. chamaecypari* on the hedge in Cheshire may have been present for some time, remaining unnoticed due to the small size of the mites and the subtle nature of damage they cause. It is also possible that this species will be found elsewhere in Britain because all the known hosts of this mite have been grown widely here for many years, eriophyoids are easily dispersed on air currents and in the case of  $\times C. leylandii$  the large scale and obligatory use of vegetative propagation would provide an efficient means of dispersal. It is most likely that *T. chamaecypari* was imported into Britain on one of its natural hosts. Non-indigenous eriophyoids are inadvertently and regularly imported into the British Isles on a variety of plants, e.g. *Aceria ficus* (Cotte) and *Rhyecaphytoptus ficifoliae* Keifer on Fig *Ficus carica*. (Ostojá-Starzewski, 2002), and occasionally become naturalised e.g. *Vasates quadripedes* Shimer on Sugar maple *Acer saccharinum* (Ecott, 2002; Wurzell, 2002).

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