

Research Article

Chromosome Study on an Endangered Oak Leaf Fern *Tectaria zeilanica* (Houtt) Sledge (Dryopteridaceae) from South India

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Submitted: 24 October 2019

Accepted: 10 January 2020

Published: 13 January 2020

ISSN: 2333-6668

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Keywords

- Chromosome
- Endangered
- *Tectaria zeilanica*
- South India

Abstract

Chromosome study on *Tectaria zeilanica* (Houtt.) Sledge which is confined to south India shows the presence of 80 regular bivalents in each spore mother cell ($n=80, 4x$). This is the first chromosome number report for this species from Tamil Nadu and it seems to be of tetraploid sexual species. It has been collected from Elumpilanthottam, Kanyakumari district of Southern Western Ghats of Tamil Nadu.

INTRODUCTION

The genus *Tectaria* Cav. is popularly known as “halberd fern” was described [1]. The genus is mostly distributed in tropical regions and maximum species are terrestrial in rain forests [2]. This group is remarkable for its extremely diverse morphology, and the estimated number of species ranges from 150 to 210 [3]. Fraser-Jenkins et al. [4], recognized 22 species in *Tectaria* from India of which about 9 species are found in South India [5] whereas Beddome [6] had collected 5 species from south India. Benniamin [7] has collected about 11 species from Western Ghats of India. The species *Tectaria zeilanica* was first reported by Beddome [6] from Tirunelveli and Travancore hills upto 2,000 feet elevation. After that Manickam et al. [8], have recollected the species after a lapse of 120 years. Recently this species has been collected from Elumpilanthottam, Marthandam, in Tamilnadu with discontinuous distribution. This is an endangered fern in South India and Sri Lanka [9]. It survives in extremely specialized habitat near the stream bank in small isolated patches and it is beautiful dimorphic leaves and all have fertile leaves with acrostichoid sori and reticulate venation with or without included veinlets. Several contributions to Cytology of Pteridophytes have been made by many researchers.

Cytology of family Aspidiaceae from South India was carried out by Bhavnandan [10] and reported chromosome number of *Tectaria* is $2n=40$, $2n=80$ and $2n=200$. Cytology of different *Tectaria* species was carried out and stated that mostly *Tectaria*

having diploids with $n=40$ or tetraploids with $n=80$ (Table 1) Irudayaraj and Manickam [11] studied the cytology of some pteridophytes of Western Ghats and reported basic chromosome number $n=41$ for *T. paradoxa* and *T. wightii*. Karyomorphological studies on three Indian species of *Tectaria*, viz., *Tectaria fuscipes*, *T. macrodonta* and *T. polymorpha* have studied [12] and reported that all the three species are diploids and the basic chromosome number is $n=40$. Recently, Vijaykant et al. [13], studied the cytology of ferns (including *T. gemmifera* and *T. wightii*) from Kolli Hills, Eastern Ghats, Tamil Nadu, and India. In India, about 35 species were reported by earlier workers [14-17] of which 24 species were accepted by Fraser-Jenkins [18]. Amongst the 24 species of *Tectaria*, cytology of 12 species (half of reported species) were studied. There are many species of *Tectaria* has to be studied systematically. The present study and endangered fern *Tectaria zeilanica* (Lour.) Sledge is cytological unknown and the present study deals with chromosome count during meiosis (Figure 1).

MATERIALS AND METHOD

Populations of this *Tectaria zeilanica* (Houtt.) Sledge fern growing wild in Elumpilanthottam forest, (400m) Marthandam, Kanyakumari District. The young fertile fronds were collected early morning and fixed in Carnoy's fluid (absolute Alcohol, Chloroform and Glacial acetic acid in the ratio of 12:3:1). For meiotic chromosome studies, the acetocarmine squash technique was followed [19]. The material gave good results after 10 days.



Figure 1 A-C *Tectaria zeilanica* (Houtt.) sledge. A: Small population along shaded stream; B: Habit with dimorphic fronds; C: Spore Mother Cell with 80 regular bivalents.

The specimen has been deposited in the Centre for Biodiversity and Biotechnology, St. Xavier's College, Tamilnadu, India.(XCH 21013).

RESULTS AND DISCUSSION

Tectaria zeilanica (Houtt.) Sledge is an endangered fern from Southern Western Ghats of India. It is growing as lithophytes between 400-1200m (Plate 1a.b). The present study on the cytology of this species from the above locality shows that it is a tetraploid sexual species with the presence of 80 regular bivalents in spore mother cells and 64 regular normal spores in each sporangium (Plate 1.c). The previous report from Munnar, Kerala, South India is also a tetraploid sexual [16]. Tetraploid sexual ($n = 80$) from Sri Lanka [17] and diploid sexual ($n = 40$) from Taiwan [18-20] are also in records.

Although cytologically this species is a stable one with either diploid or tetraploid sexual, the morphology of fertile and sterile fronds shows that it may of hybrid origin. Thus the sterile in the sterile frond depth of lobing of the lamina is highly variable from simple entire lamina to trilobed lamina with intermediates like shallowly lobed lamina. The trilobed fertile frond also an indicative of hybrid origin. Such kind of intermediate fronds has been reported in several interspecific and intergeneric hybrids like *Lindsaea x heterophyllya* Dryand. Between the simply pinnate *L. ensifolia* Sw. and bipinnate *L. orbiculata* (Lam.) Mett [21] and

Table 1: *Tectaria* species with account cytology from India.

SL.NO	SPECIES	CHROMOSOME DATA
1	<i>Tectaria chattagrammica</i> (C.B.Clarke) Ching	Not yet studied
2	<i>T. coadunata</i> (Wall. ex Hook. & Grev.)	n= 40 & 41 (23)
3	<i>T. decurrens</i> (C.Presl) Copel	n=40 II
4	<i>T. fauriei</i> Tagawa	n= 40 III
5	<i>T. fuscipes</i> (Wall. ex Bedd.) C.Chr	n= 40; 2n=80 (24)
6	<i>T. gemmifera</i> (Fee) Alston	n = 41 (25)
7	<i>T. griffithii</i> (Baker) C. Chr.	n= 40 (26)
8	<i>T. herpetocaulos</i> Holttum	Not yet studied
9	<i>T. heterocarpa</i> (Baker) Ching	Not yet studied
10	<i>T. impressa</i> (Fee) Holtum	n= 78 (26)
11	<i>T. ingens</i> (Desv.) C.Chr.	n= 78 (26)
12	<i>T. ingens</i> (Desv.) C.Chr.	Not yet studied
13	<i>T. kehdingiana</i> (Kuhn) M.G. Price	Not yet studied
14	<i>T. melanocaulos</i> (Blume) Copel.	Not yet studied
15	<i>T. multicaudata</i> (C.B. Clarke) Ching	Not yet studied
16	<i>T. paradoxa</i> Sledge	n= 40 & 80 (27)
17	<i>T. polymorpha</i> (Wall, ex Hook.) Copel	n= 40, 41 & (27)
18	<i>T. pseudosifolia</i> Fraser-Jenkins & Wangdi	Not yet studied
19	<i>T. puberula</i> C.Chr.	Not yet studied
20	<i>T. simonsii</i> (Baker) Ching	n=78 (26)
21	<i>T. subconfluens</i> Ching	Not yet studied
22	<i>T. trimenii</i> C. Chr.	Not yet studied
23	<i>T. vasta</i> (Blume) Copel	=78 (26)
24	<i>T. wightii</i> (C. B. Clarke) Ching	n = 41 (24)
25	<i>T. zeilanica</i> (Houttum) Sledge	Present Study

Lindsaeosoria x flynnii W. H. Wagner [22] between tripinnate or quadripinnate *Odontosoria chinensis* (L.) J. Sm. and simply pinnate *Lidsaea ensifolia* Sw. The fertile frond of the present gathering is perfect trilobed with entire margin. The trilobed fertile fronds with flattened, entire or undulate or shallowly lobed margined pinnae have also been reported from other countries (<http://www.efloras.org>). As, further molecular studies will give idea about the origin of this species through hybridization.

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Cite this article

Sundari MS, Benniamin A, Irudayaraj V (2020) Chromosome Study on an Endangered Oak Leaf Fern *Tectaria zeylanica* (Houtt) Sledge (Dryopteridaceae) from South India. *Int J Plant Biol Res* 8(1): 1115.