

# Chromosome analysis of *Ischnura inarmata* (Coenagrionidae : Zygoptera : Odonata)

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**Abstract.** The results of chromosomal studies on a cytogenetically new species *Ischnura inarmata* have been described and illustrated. These include behavior of chromosomes in cell cycle, chromosome number, karyotype and m : X ratio. The karyological description of this species is  $2n=27$  m with XO sex determining mechanism.

**Keywords :** *Ischnura inarmata*, Spermatogonium, Karyotype, XO

## Introduction

Family Coenagrionidae, which includes practically a maximum number of species studied so far, has been described by Dasgupta (1957) as the most primitive of all families of Odonata and show type number  $2n=27m$ . Approximately, 15 species belonging to genus *Ischnura* have been described so far and majority of them also possess a typical number that is, 27 m (Kichijo, 1942 ; Dasgupta, 1957 ; Cruden, 1968 ; Kiauta, 1969 ; Kiauta and Brink, 1978 ; Tyagi, 1978 ; Handa and Kochhar, 1980, 1981 ; Kiauta and Kiauta, 1980, 1983 ; Tyagi, 1982). The sole exception is *Ischnura pumilio* in which a diploid chromosome number is 29 m (Kiauta, 1979). The present communication deals with the karyotypic description of a cytogenetically new species *Ischnura inarmata* with special reference to behavior of chromosomes in the cell cycle, chromosome number, karyotypic description and m : X ratio.

## Materials and methods

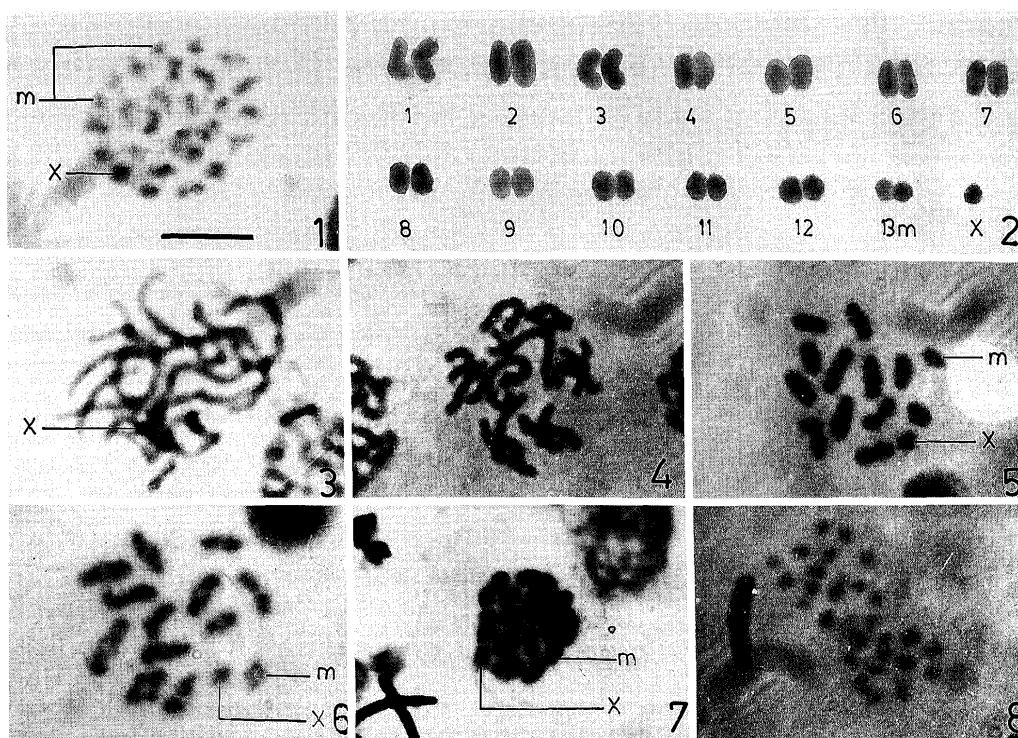
Males of *Ischnura inarmata* were collected from standing and running water bodies of Punjab and Himachal Pradesh (India) during the pre-monsoon and post-monsoon seasons of years 1992-1994. The chromosome preparations were made from the gonads of adults by employing air drying technique as described by Sandhu and Walia (1995).

## Results and discussion

Majority of the spermatogonial metaphase plates show 27 elements in which there are 26 autosomes and one sex chromosome, autosomes also include one tiny pair of m chromosomes. The X chromosome is the smallest element and is two and half times smaller than the largest autosomal pair (Figs. 1 and 2). The m : X ratio is 1.08. In the pachytene stage, chromatin material appears in the form of loosely coiled network in which lies a darkly stained heteropycnotic body, probably the sex chromosome (Fig. 3). Diplotene stage reveals single terminal/sub-terminal chiasma per bivalent, which give 'X' or 'V' shapes to the elements (Fig. 4). During diakinesis, 14 elements are visible, which include 13 autosomal bivalents and one X univalent, the latter mostly takes up a peripheral position on the plate. The recombination index is 26 (Figs. 5 and 6). During metaphase I, due to further condensation and terminalization of their chiasmata, the elements appear rod shaped (Fig. 7). At metaphase II, two groups of chromosomes are present, each group shows 14 elements, that is 13 autosomes and one X element (Fig. 8).

Cytogenetical data pertaining to genus *Ischnura* has been presented by many authors (Kichijo, 1942 ; Dasgupta, 1957 ; Cruden, 1968 ; Kiauta, 1969 ; Kiauta and Brink, 1978 ; Tyagi, 1978 ; Handa and Kochhar, 1980, 1981 ; Kiauta and Kiauta, 1980, 1983 ; Tyagi, 1982) and shows a diploid chromosome number 27m. The only exception is *Ischnura pumilio* in which Kiauta (1979) has observed  $2n=29m$ . This excess number from the type number, as explained by him, is not of secondary origin, as all the elements are primary in origin. This species thus appears to be ecologically adapted to the

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Figures 1-5. Chromosome analysis of *Ischnura inarmata*. (Bar indicates 10  $\mu$ m)

1: Spermatogonial metaphase ( $2n=27m$ ). 2: Karyotype. 3: Pachytene. 4: Diplotene. 5: and 6: Diakinesis. 7: Metaphase I. 8: Metaphase II.

locality. The present study on *Ischnura inarmata* however, shows no deviation from a typical Coenagrionid number  $27m$ .

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