were raised, semi transparent but soon becoming uniformly turbid opaque white. On an acidic medium slime turned more tenacious. Cultures were acid tolerant upto pH 5·0. No growth in peptone solution or in nitrate medium. The cultures could fix 3·1–5·2 mgm/N/gm sucrose in 20 days in Derx's medium at 28°–30° C in stationary flasks. In controlled tests, these cultures were capable of invading the root cortex of rice plants grown under aseptic conditions. In a similar test with rice plant growing at A.R.S. Karjat, District Kulaba, in neutral soil (pH 7·00) where *Azotobacter chroococcum* predominates, it was seen that this organism could also invade the root cortex of rice.

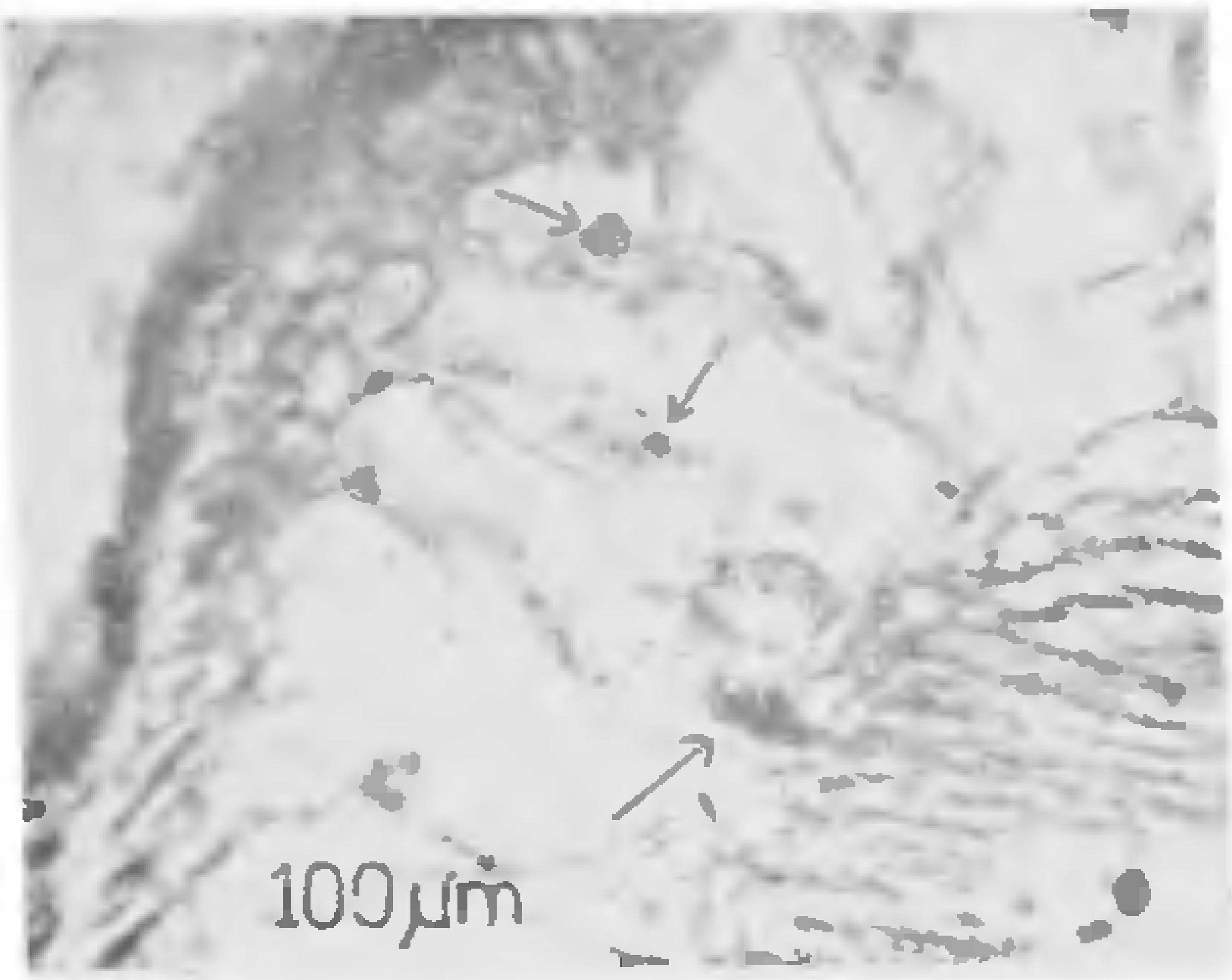

FIG. 1. Photomicrograph of T.S. of roots of *Oryza sativa* showing occurrence of *Beijerinckia indica* in the cortical cells.

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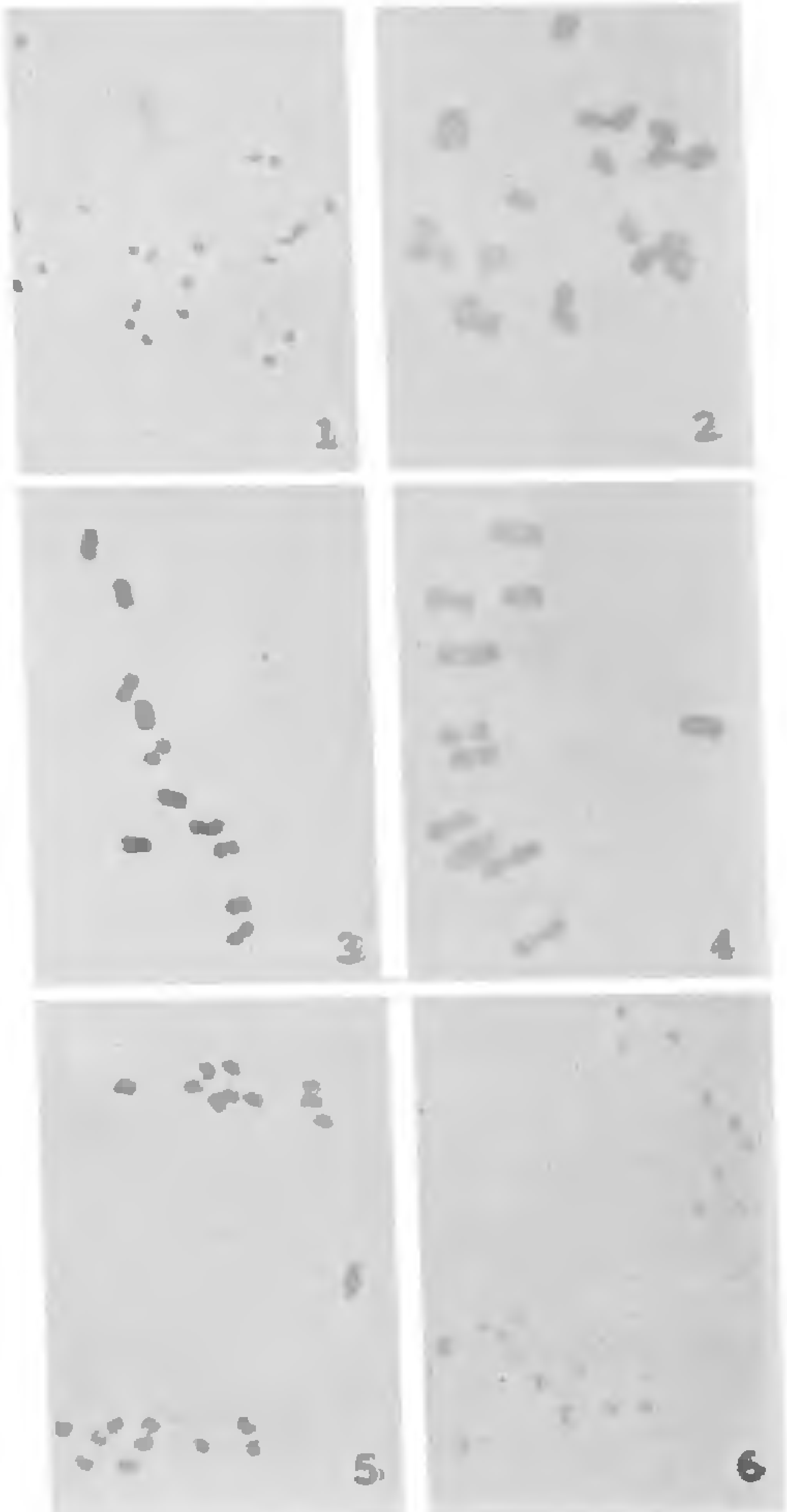
A NOTE ON THE MEIOSIS IN TWO SPECIES OF TICKS (ACARI: IXODIDAE)

CYTOTAXONOMY has, of late, come as a handy tool in understanding the chromosomal mechanism of speciation and also to determine the evolutionary status of organisms. However, very little attention has been paid to the ticks. Of the 800 taxonomically described species, the cytologically known forms are extremely meagre. This lack of interest is due mostly to the technical difficulty inherent in the analysis of the tick chromosomes because of their small size, ill-defined meiotic stages and obscure nature of the sex-determining mechanism. In this short communication, we wish to project the meiotic cycle in two species of common ticks—*Boophilus microplus* and *Rhipicephalus sanguineus*.

The testes were dissected in Shen's physiological saline and fixed in 1 : 3 acetic acid methanol. They were then stained and squashed in lacto-aceto-orcein[1]

The spermatogonial metaphases of both the species contained 21 telocentric elements (Figs. 1 and 2)



FIGS. 1-6. Fig. 1. Spermatogonial metaphase of *B. microplus*. Fig. 2. Spermatogonial metaphase of *R. sanguineus*. Fig. 3. Metaphase I of *B. microplus*. Fig. 4. Metaphase I of *R. sanguineus*. Fig. 5. Anaphase I of *B. microplus*. Fig. 6. Anaphase I of *R. sanguineus*.

the largest of which was without a partner. Thus the $2n = 20A + X$ and the sex mechanism conforms to the XO type in the male. The leptotene nucleus contained granulated threads of chromatin. With the onset of pachytene, the double nature of chromosomes became distinct in some plates although the exact nature of pairing was not clear. In diplotene and diakinesis, the bivalents and the univalent X hardly exhibited any set pattern of orientation. The bivalents were dumb-bell-shaped at metaphase I. The co-orientation of the autosomal bivalents on the metaphase spindle and the pre reductional precocious separation of the sex element are some of the other points of interest (Figs. 3 and 4). Unlike in *R. sanguineus* (Fig. 6), the sex chromosome behaved rather abnormally at anaphase I in *B. microplus*. When the partners of the autosomal bivalents had migrated to the poles, the X remained as a laggard (Fig. 5). But it made up the deficiency at late anaphase I. Naturally two types of metaphase II cells were produced, with or without the sex element. In anaphase II the sex chromosome divided normally like the autosomes and passed on to the spermatid nuclei, eventually resulting in two types of sperms, *viz.*, one with 10 autosomes and the other with 10 autosomes and the X.

The most common chromosome formula in ticks is $20A + X$ in male and $20A + XX$ in female. All species of the genera *Haemaphysalis* (except *H. kitaokai*), *Metastriata*[2] and *Dermacentor*[3-5] have a similar chromosome formula. In the genera *Argas*[6] and *Ixodes* (except *I. ricinus*)[7], however, the $2n$ number consists of $24A + XY$ in the male. Oliver *et al.*[2] consider $2n = 20A + X$ in male (and $2n = 20A + XX$ in the female) to be a primitive condition and, therefore, regards genera like *Ixodes* and *Argas* (with $2n = 24A + XY$) as evolutionarily more advanced. White[8] also holds the view that $XO : XX$ is the most primitive sex mechanism in the ticks while XY and X_1X_2Y as seen in the genus *Amblyomma* have been derived through translocations between the X and autosomes. This again substantiates the antiquity of the two investigated species of ticks.

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STORAGE OF SPERMATOZOA IN THE EPIDIDYMIS OF THE BAT, *HIPPOSIDEROS SPEORIS* (SCHNEIDER)

Among the various reproductive strategies adopted by mammals, the survival of the spermatozoa for several months within the female genital tract is an unique mechanism developed by bats[1-7]. A second type of reproductive adaptation noticed in some bats is the storage of spermatozoa in the cauda epididymis of the male for long periods after the regression of the testis[8-10]. Both these mechanisms were noticed in some bats inhabiting cold and temperate climates, and were supposed to be adaptations to meet the demands of a protracted severe winter when the bats remain in deep hibernation. However, the viability of inseminated spermatozoa, stored in the genital tract of the female for long periods, has been reported recently in a few tropical bats also[11-15]. It is noteworthy that the storage of spermatozoa for several months in the female genital tract has been so far known to occur only in some vespertilionid and rhinolophid bats, and in the epididymis only in some vespertilionids.

The present paper is not only the first report on the viability for three to four months of the spermatozoa stored in the cauda epididymis in a tropical bat, but is also the first report on the occurrence of such a phenomenon in a non-vespertilionid bat. This unique feature of reproduction of *Hipposideros speoris* came to light while studying the details of the sex-cycle of this species collected around Chandrapur in eastern Maharashtra (19° 57′ N and 79° 21′ E).

A brief account of the breeding biology of *Hipposideros speoris* at Chandrapur is given here as a background. This species has an annual reproductive cycle and breeds once a year, each female bringing forth a single young one each time. An examination of the female genitalia revealed that the majority of the females in the colony conceived during the third week of December and delivered the young in the first week of May after a gestation of 135–140 days. A few females, which did not conceive in December, conceived in January or during the following months until about the middle of March and delivered the young after the normal gestation period. The last