the sporocarps of this plant have not been analysed for phenolic compounds.

Mature sporocarps were collected from local water bodies, dried under shade and powdered. Extraction, analysis and identification of polyphenols in the sporocarps, were followed by two dimensional paper chromatographic techniques[7].

Marsiline present in *M. minuta* and *M. rajasthanensis*, has been reported to be used as a sedative to treat epilepsy[4]. The present investigations indicated the presence of two polyphenols. These were identified as quercetin-3-rutinoside and naringenin 7-rhamno glucoside and confirmed with authentic samples. Quercetin-3-rutinoside also occurs in ferns like *Actiniopteris radiata*, *Dryopteris oligophlebis* and *Asplenium trichomans*.

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USE OF COMPUTER CARDS AS EDGE-PUNCHED CARDS

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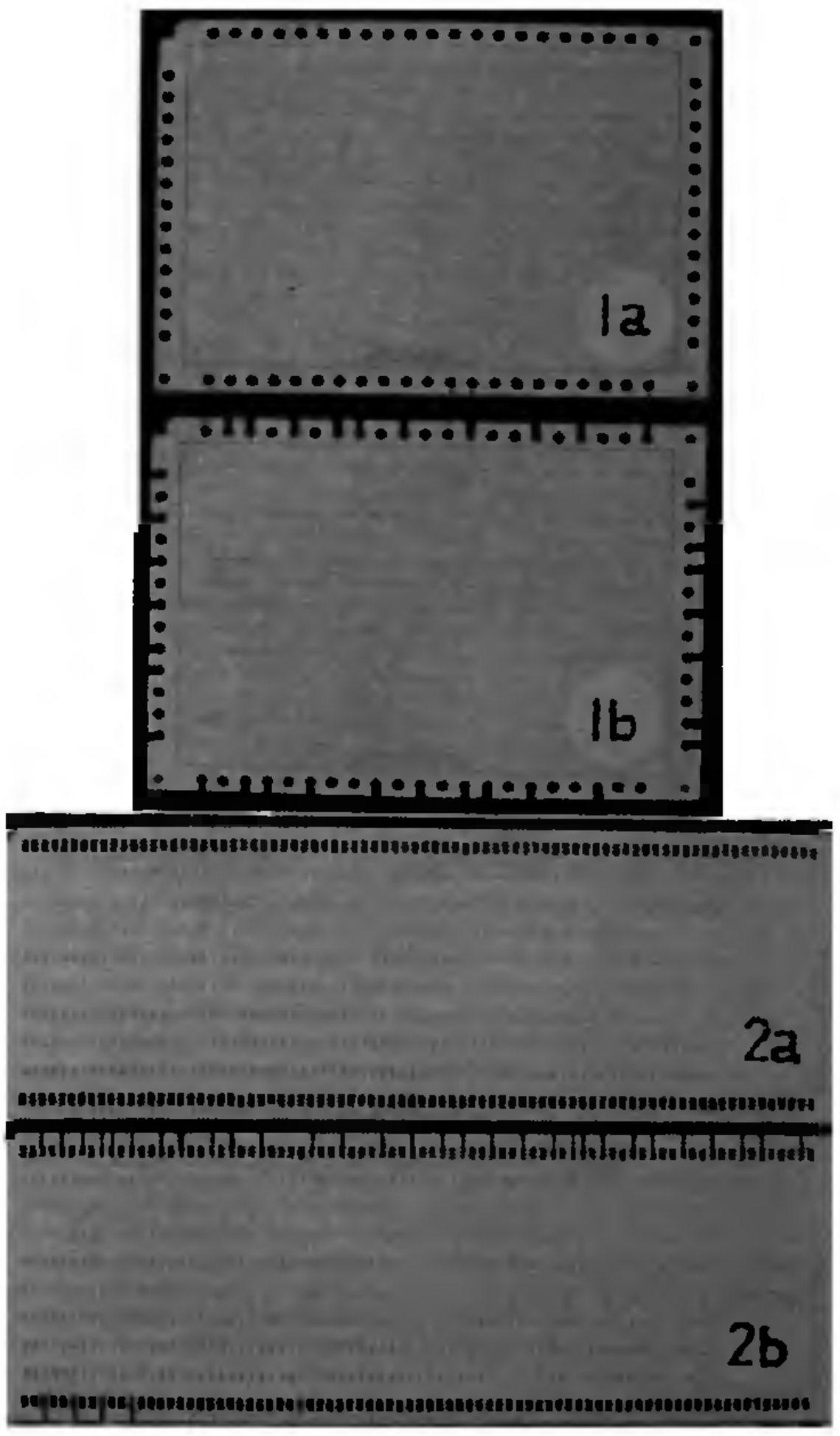
TRADITIONAL dichotomous keys to biological identification are single-access (single point entry) systems: the sequence of entry dictated by the author of the key. Multi-access keys are a distinct advantage over the dichotomous keys as there is no restriction on the choice and sequence of characters while using the key. Only those character states that are actually present in the specimen being determined are used in any order preferred by the user.

Duke[1] coined the term 'Polyclave' for multi-access keys represented by card overlay systems. Multi-access keys on punched cards come in two forms: edge-punched cards and body-punched cards. Both serve identical purposes as devices of data storage, retrieval and identification. Edge-punched card keys are in use, for example, at the French Institute, Pondicherry (Palynological characters), and the British Museum (Natural History), London (Lepidoptera). There are several examples of body-punched card keys[2-4].

In the edge-punched card system one card represents one taxon. The holes are distributed along the margins of the card (figure 1a) and one hole represents one character state. While loading data on to the cards, if a particular character state is present in the taxon, the corresponding hole is clipped out leaving a



Figures 1 & 2: 1. Standard edge-punched card a) blank b) data card **2.** Edge-punched computer card a) blank b) data card.

'U' like notch (figure 1b). The data card is then a combination of holes and 'U's (figure 1b). While using the key, cards are sorted out on needles, selecting the character states present in the specimen. The needles are pushed through the particular holes and the whole stack of cards is lifted up on the needles. Those cards representing the taxa with the character states selected would fall down, the rest being retained on the needles. The process is repeated selecting other character states till the identification is complete. If the holes of character states not present in the taxon are notched, the cards of taxa with the selected character states ould stay on the needles rather than dropping off them[5].

Edge-punched cards are patented, special manufacture items that have to be imported into several countries like India. This is probably one of the reasons for the very rare use of edge-punched cards in India. Another disadvantage of the standard edge-punched cards is that the hole (character state) taking capacity is low relative to the card size. For example, the card in figure 1 is 15 cm × 10.5 cm and takes only 71 holes. The French Institute card takes 162 holes but is considerably large (24 cm × 18 cm). The more the number of character states to be represented, the larger is the size of the card, which becomes unwieldy particularly when these sets are meant to be field keys.

In order to overcome these difficulties, the author proposes the use of standard computer cards as edge-punched cards. The computer card is handy in size (18.7 cm × 8.2 cm) and accommodates 80 holes along each of the two long sides (total 160 character states) (figure 2a). If required, another 16 character states can be accommodated on the short sides of the card. Computer cards are inexpensive, easily available and card punches are easily accessible. To prepare blanks, all the holes in rows 0 and 9 are machine punched and the edges of the card along these rows trimmed leaving a 2 mm margin (figure 2a).

Data are incorporated the same way as the standard cards, by clipping the holes out (figure 2b). The names of the character states corresponding to the holes can be printed on all cards if required or a hand written master card can be made for this purpose. Data loaded cards can be wax coated (by dipping in molten wax) to make them hardier and damp proof. A polyclave of this kind to the species of *Cassia* occurring in India is in use in the author's laboratory (Rao and Subhashini, unpublished).

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EVIDENCE FOR SEED TRANSMISSION OF *XANTHOMONAS CAMPESTRIS* PV. *ORYZAE*

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BACTERIAL blight of rice caused by *Xanthomonas campestris* pv. *oryzae* has been known to occur in India since 1951[1]. Its occurrence has become more common with the introduction and large scale cultivation of high yielding susceptible cultivar TN 1 in 1965. Since then, it occurs year after year in different rice growing areas. Infected seeds are believed to serve as the primary source of inoculum[2,3]. However, this has been questioned[4-7]. The severe outbreak of bacterial blight epidemic in the non-traditional rice growing areas (Punjab and Haryana) is of special significance with reference to primary source of inoculum for inducing such wide spread disease. An attempt was made to study the movement of the bacterium in rice seedlings raised from infected seeds. The results are presented in this paper.

Seeds of the rice cultivars Parwanipur 1 (Parwanipur, Nepal), TN 1 and Karuna (CRRI, Cuttack) and IR 8 (Amritsar, Punjab) severely affected by bacterial blight were collected in September 1979, 1980 and 1981, respectively. They were dried and stored in cloth bags in the laboratory. These seeds were sown after six months in 20 cm diameter Petri dishes filled with sterilized soil and the dishes were watered with sterile water twice daily. The temperature and relative humidity during the experimental period ranged between 20° and 37° C and 50 and 75%, respectively.