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AMSTRAD MICROCOMPUTER AS A COUNTER FOR POLLEN AND SPORES IN POLLEN ANALYSIS

Summary: The program "zsp" stores in memory and prints complete pollen records which include absolute numbers of pollen and spores, their percentages and concentration values.

The program "zsp" was written in Mallard BASIC for AMSTRAD PCW.8256 Personal Computer using PCW 8256 Personal Computer Word Processor. The program allows to replace a traditional handwritten pollen record with the record on the computer screen which can be printed after the sample counting is finished. The complete print contains absolute numbers of pollen and spores, their percentages calculated from different sums, and pollen concentration values.

The keyboard is used for counting in the following way. Each letter codes one taxon. Single pressing of key records one sporomorph. Next pressing of the same key adds one specimen to the previous sum and the new sum is shown on the screen. 76 taxons may be coded: 26 taxons by pressing only one key with proper letter (A to Z), the next 26 by using two keys - space bar and proper letter (A to Z), and the following 24 by simultaneous pressing keys SHIFT and proper letter (A to X).

Each taxon is classified to one of the categories denoted with numbers 1-9. In our example these categories are named not quite correctly "life forms" (e.g. 1 stands for trees, 2 for shrubs, 6 for aquatics, 8 for spores and so on). The "zsp" program user can introduce other taxons to the program and make his own categories denoted by numerals 1-9. Numbered categories allow to calculate several sums which include different taxons and percentage values of these taxons from chosen sums.

An example of pollen record is given in Table 1. Column I gives taxon codes, names of which are shown in column II. Sporomorph numbers are given in column III and the proper totals in IV. These total sums are basis for

Table 1

Final results of the operation of the program "zsp": record of one sample.
 Profil: pei4, numer probki^{a)} 23, data^{a)}: 1988-04-11

| I | II | III | IV | V | VI | VII | VIII |
|----|----------------------------|--------------|--------|---|----------|--------|----------|
| A | Alnus | 5 / 1353 = | 0.3 % | | AP = 950 | 0.5 % | 0.207 L |
| B | Betula | 120 / 1353 = | 8.8 % | | AP = 950 | 12.6 % | 4.976 L |
| C | Cyperaceae | 243 / 1353 = | 17.9 % | | | | 10.076 L |
| E | Ericaceae | 2 / 1353 = | 0.1 % | | | | 0.082 L |
| G | Gramineae | 26 / 1353 = | 1.9 % | | | | 1.078 L |
| J | Juniperus | 16 / 1353 = | 1.1 % | | | | 0.663 L |
| K | Polypodiaceae | 8 / 1363 = | 0.5 % | | | | 0.331 L |
| L | Lycopodium wsk. | 545 | | | | | |
| P | Pinus | 782 / 1353 = | 57.7 % | | AP = 950 | 82.3 % | 32.427 L |
| Q | Quercus | 2 / 1353 = | 0.1 % | | AP = 950 | 0.2 % | 0.082 L |
| R | Rosaceae | 7 / 1353 = | 0.5 % | | | | 0.29 L |
| S | Salix | 11 / 1353 = | 0.8 % | | | | 0.456 L |
| X | inne wodne ^{a)} | 4 / 1358 = | 0.2 % | | | | 0.165 L |
| -A | Artemisia | 32 / 1353 = | 2.3 % | | | | 1.326 L |
| -B | Chenopodiaceae | 8 / 1353 = | 0.5 % | | | | 0.331 L |
| -I | inne zielone ^{b)} | 1 / 1353 = | 0 % | | | | 0.041 L |
| -K | inne spory ^{c)} | 1 / 1365 = | 0 % | | | | 0.041 L |
| -L | Larix | 12 / 1353 = | 0.8 % | | AP = 950 | 1.2 % | 0.497 L |
| -P | Picea | 2 / 1353 = | 0.1 % | | AP = 950 | 1.2 % | 0.082 L |
| -R | Rubiaceae | 2 / 1353 = | 0.1 % | | | | 0.082 L |
| -S | skorodowane ^{d)} | 62 / 1353 = | 4.5 % | | | | 2.571 L |
| -U | Umbelliferae | 2 / 1353 = | 0.1 % | | | | 0.082 L |
| -V | Typha/Sparganium | 1 / 1358 = | 0 % | | | | 0.041 L |
| -X | inne ^{e)} | 14 / 1353 = | 1 % | | | | 0.58 L |
| -Y | Sphagnum | 1 / 1363 = | 0 % | | | | 0.041 L |
| +C | Comp. Tub | 4 / 1353 = | 0.2 % | | | | 0.165 L |
| +P | Popul | 4 / 1358 = | 0.2 % | | | | 0.165 L |
| +S | zdegradow ^{f)} | 27 / 1353 = | 1.9 % | | | | 1.119 L |

Formy życiowe: 1-drzewa; 2-krzewy; 3-krzewinki; 4-zielone; 5-varia;
 6-wodne; 7-błotne; 8-spory; 9-Lycopodium^{***}

<1>=923, <2>=27, <3>=2, <4>=325, <5>=76, <6>=4, <7>=1, <8>=10

<1+2+3+4> = 1277

<1+2+3+4+5> = 1353

<1+2+3+4+5+6+7> = 1358

<1+2+3+4+5+8> = 1363

Table 1 (continued)

$\langle 1 \rangle / \langle 1+2+3+4 \rangle = 72.2 \%$, $\langle 2 \rangle / \langle 1+2+3+4 \rangle = 2.1 \%$,
 $\langle 3 \rangle / \langle 1+2+3+4 \rangle = 0.1 \%$, $\langle 4 \rangle / \langle 1+2+3+4 \rangle = 25.4 \%$.

* - number of sample

** - date

*** - life forms: 1-trees; 2-shrubs; 3-dwarf-shrubs; 4-herbs; 5-varia;
 6-aquatics; 7-reedswamp plants; 8-spores; 9-Lycopodium

a) other aquatics; b) other herbs; c) other spores; d) corroded; e) other;
 f) degraded.

 percentage values of taxons shown in column V. In our example, percentage number of e.g. *Alnus* was counted from the sum 1358, which included categories 1+2+3+4+5 and percentage number of *Polypodiaceae* from the total 1+2+3+4+5+8 categories which equaled 1368. Column VI gives sum of AP and VII - percentages of taxons in relation to the total of AP. Pollen concentration values are in column VIII, where L is the concentration symbol. Taxon categories, counted sums and percentages of plant groups calculated from various sums are printed below the table.

Often more then 76 taxons appear in our samples therefore additional entries may be coded by special keys, for instance "X" stands for other aquatics plants, "-I" for other herbs etc. Number of *Lycopodium clavatum* spores, added in tablettes is counted but enters only in the calculation of pollen concentration.

The "zsp" program can cancel any wrong note, show data on the screen and remember all data at any moment on 3 inch Compact Floppy Disc. The counting may be continued immediately after the results are stored on disk. The authors intend to work out the possibility for using data sets prepared by this program in published graphic programs (Birks, 1986).

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MIKROKOMPUTER AMSTRAD PCW 8256 JAKO URZĄDZENIE DO LICZENIA ZIARN PYŁKU

Streszczenie

Program "zyp" umożliwia wykorzystanie komputera jako urządzenia do liczenia, w którym klawisze klawiatury służą do zapisywania poszczególnych taksonów, oznaczanych w trakcie liczenia próbki, a wynik liczenia jest wyświetlany bezpośrednio na ekranie. Wyniki są zapamiętywane na dyskietkach, a po skończonym liczeniu drukowany jest gotowy protokół pyłkowy, zawierający bezwzględne wartości policzonych sporomorff, wybrane sumy sporomorff, przeliczenia procentowe oraz wartość koncentracji sporomorff w liczonej próbce.

ВЫЧИСЛИТЕЛЬНАЯ МАШИНА AMSTRAD 8256 С УСТРОЙСТВОМ ДЛЯ СЧЕТА ПЫЛЫШ

Резюме

Программа "zyp" делает возможным использование вычислительной машины как устройства для счета в котором клавиши клавиатуры обозначают таксоны. Машина показывает результаты на экране и сохраняет их в памяти. После окончания счета получается напечатанный протокол, в котором отражается следующая информация: количество спороморф, избранные суммы спороморф, проценты и концентрация спороморф в исследованном образце.