A POLLEN GRAIN – FUNGAL SPORE DATA SPREADSHEET

Coates, L.L. Ottawa Civic Hospital, Biochemistry Section.
Crompton, C.W. Agriculture Canada, CLBRR, Biological Resources Division.
Drouin, M.A., Yang, W.H. Ottawa Civic Hospital, Department of Medecine.
Section of Allergy,
Ottawa, Ontario, Canada. K1Y 4E9

Abstract:

A precision-based re-evaluation of a Lotus 123 spreadsheet developed for economical counting of Rotorod collections introduced at the 1991 symposium in Michigan. The spreadsheet utilizes macro programmed commands which allow rapid and simultaneous counting of up to 24 species. Seasonal re-programming of 10 keys expands this capacity to 34 species. Calculation parameters for each species are individually programmed. These parameters include the number of counts, number of fields viewed and the magnification used. This provides for individual attention and maximum flexibility as to magnification, counting area and sample density. Sample size, a function of sample area / particle density, and particle distribution on the duplicate rods of the rotorod collector are evaluated by precision comparisons of counts on duplicate rods. Correlations exceeded the 95% level. A working computer program will be included in the display.

Poster presented at the symposium of the:
PAN AMERICAN AEROBIOLOGY ASSOCIATION
University of Toronto
June 1992.

MATERIALS AND METHODS:

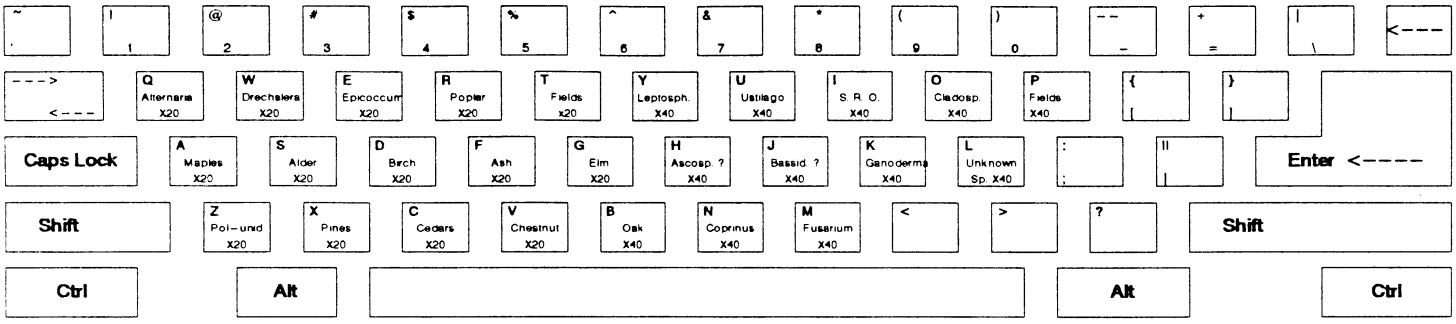
Correlations were done by counting all species normally identified In 15 randomly chosen fields on each of the two rods of a Rotorod collection. To minimize subjectivity all counts were done by the same person. Counts were first done using a 20X objective and repeated using 15 additional random fields and a 40X objective. The areas counted with respect to the total countable sample area on the rods was 15 fields – of 110 fields or 13.6% at 20X, and 15 fields of 430 fields or 3.5% at 40X.

Limitations of the technique include the Sampler and the magnification. The manufacturer advises and others concur* that the “Rotorod” Sampler Has a low efficiency when sampling small particles. A 40X objective makes identification of non-distinctive praticles Less than 10 microns difficult or uncertain. If the samples are Themselves suspect, the value of expending time on evaluation of These samples must be questioned. The main suspected allergens Recorded as unidentified by this methodology are: Aspergillus, Penicillium, and some Ustilaginales.

* Operating Instructions for the Rotorod Sampler
Sampling Technologies Inc.
Los Altos Hills, CA.

Manual for Sampling Airborne Pollen
Ogden E.C. et al.
Hafner Press New York 1974.

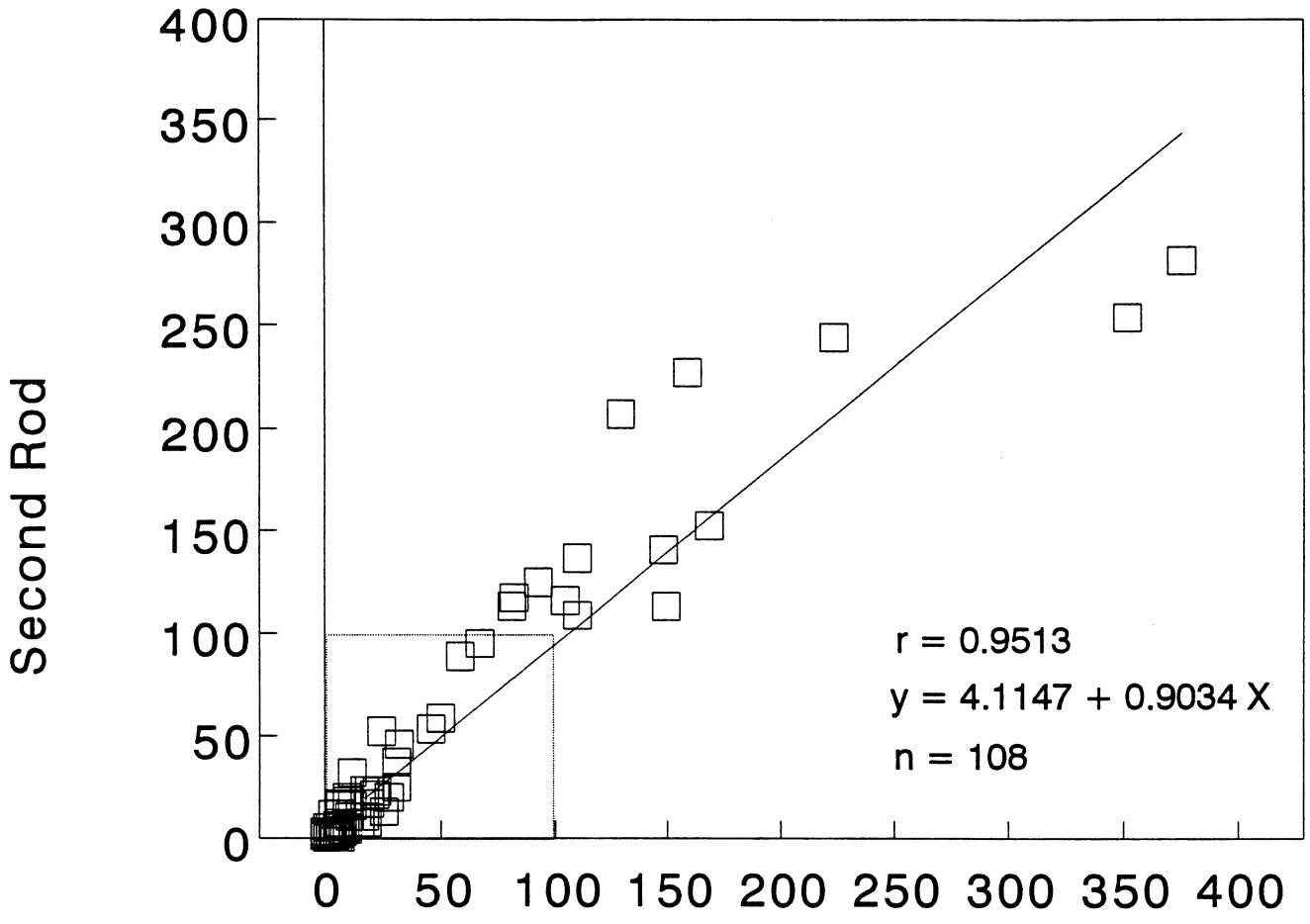
KEYBOARD ARRANGEMENT



Seasonal Changes

Date:	From:	To:	Key
Mid March Reset New Season:		Maples	A
		Chestnut	V
		Birch	D
		Ash	F
		Elm	G
		Poplar	R
		Alder	S
		Oak	B
		Cedar	C
		Pine	X
Early June	Poplar	Grass	R
Mid June:	Alder	Compositae (Other)	S
Mid to Late June:	Oak	Pithomyces	B
	Chestnut	Stemphyllum	V
	Cedar	Uredinales	C
	Elm	Lythrum	G
	Maples	Chenoams	A
	Ash	Ambrosia	F
	Birch	Solidago	D
Early to Mid July:	Pine	Curvularia	X

Regression Comparison of Counts with 20 X Objective



First Rod

Sample Counted: 15 fields

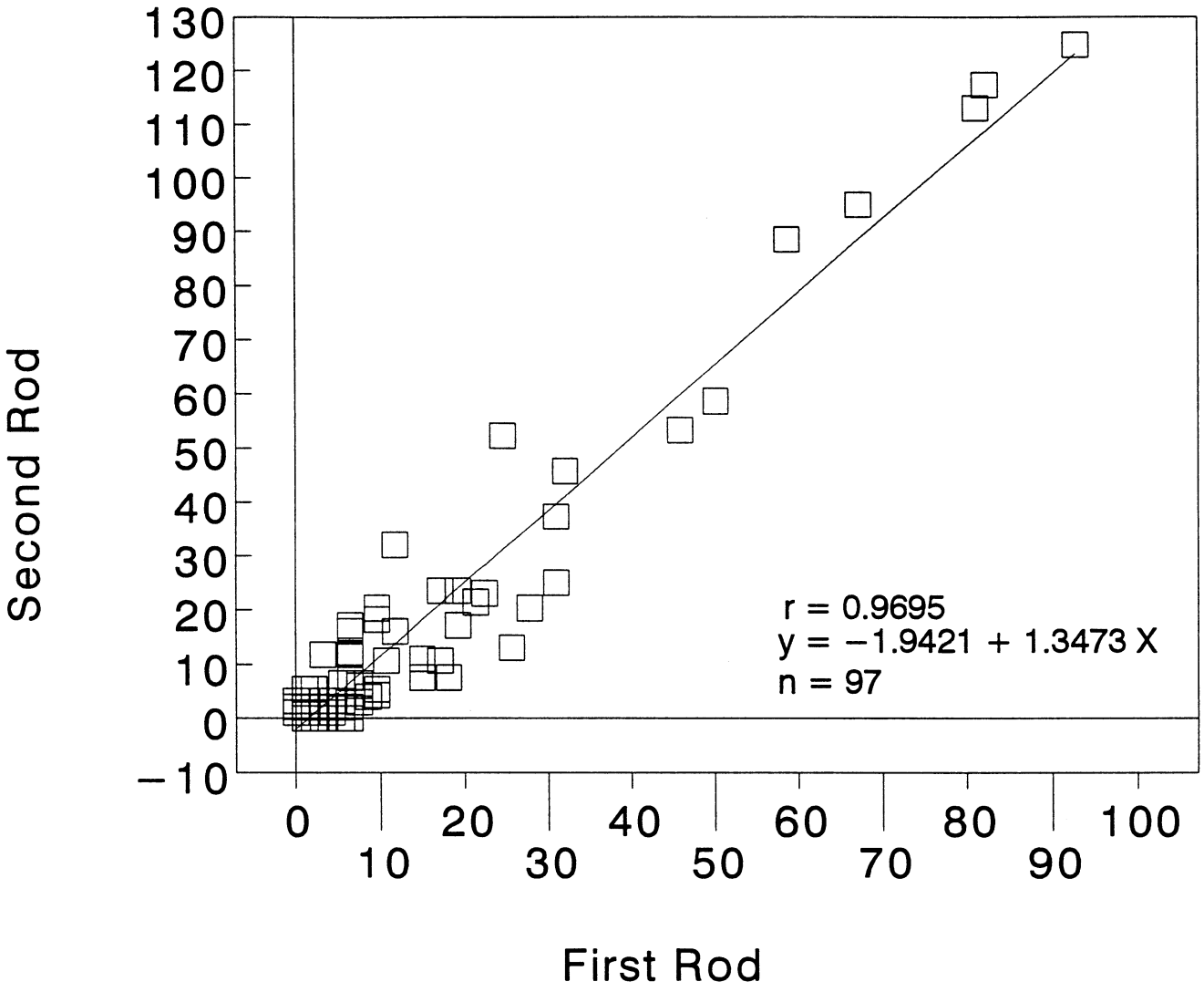
27.3 % of sample surface area of one ro

or 13.6 % of total sample

All Data Points on 12 Pairs of Rods Counted

Counts Expressed as Particles per Cubic Meter of Air

Regression Comparison of Counts with 20 X Objective



Sample Counted: 15 fields

27.3 % of sample surface area of one rod

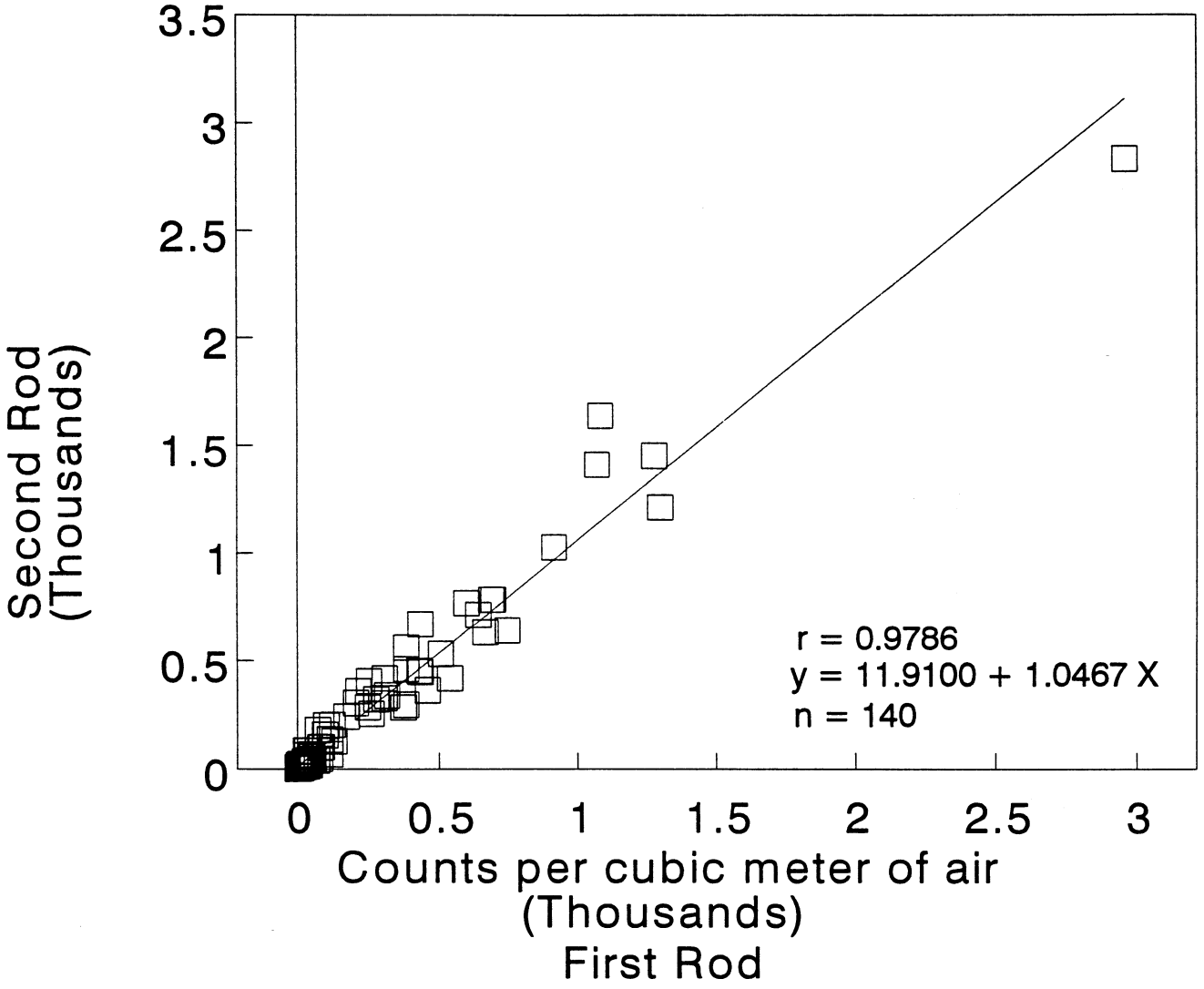
or 13.6% of total sample

Data Points with less than 100 counts on first rod plotted

12 Pairs of Rods Counted

Counts Expressed as Particles per Cubic Meter of Air

Regression Comparison of Counts with 40 X Objective



Sample Counted: 15 fields

7.0 % of sample surface area of one rod

or 3.5 % of total sample

All Data Points on 12 Pairs of Rods Counted

Counts Expressed as Particles per Cubic Meter of Air

CORRELATION SUMMARY:

The resulting correlation coefficients were in the mid 90's. There is An observed difference in the 20X correlations above and below 100 counts but nothing is significant because of the low sample number (n = 11) within counts above 100

Interestingly despite the smaller sample area used at 40X (3.5% as opposed to 13.6% at 20X) the correlation is better. This is because the number of observations is higher: n = 108 at 20X; as opposed to 140 at 40X. Also the actual counts are higher: tens and hundreds at 20X as opposed to hundreds and thousands at 40X. These two factors combine to increase the accuracy of the estimate to a greater extent than the resulting decrease due to the smaller sample size.