Table 2. Effect of Moisture Content on Respiration

Moisture content of soil	Respiration (μl.) after 8 hr. Oxygen uptake	Carbon dioxide evolved	R.Q.
100%—saturated	22	72	3·1
60% (water holding capacity)	145	147	1·0
48% (field capacity)	125	100	0·8
24%	65	60	0·9
5% (air-dry)	0	0	

Table 2 shows that the activity of the soil micro-organisms in this sample of soil was at a maximum above field capacity but was less in the saturated soil. Webley[3], using yeast cells suspended on soils of different moisture-content, found a similar decline in respiration above an optimum moisture-level, and demonstrated that this was due to a reduction in the availability of oxygen. The results obtained indicate a similar behaviour by the normal soil population, and there is a relationship between soil moisture and overall metabolism as indicated by the respiratory quotient.

The effect of particular added substrates can also be investigated by this method. A more detailed account will be published elsewhere.

A. D. Rovira

Agricultural Microbiology Laboratory,
Faculty of Agriculture,
University of Sydney.
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A Microgasometric Procedure

In experiments now being carried out on the X-ray induced decomposition of azides, we have found it necessary to develop a simple method for measuring small volumes of gas (of the order of several cubic millimetres) evolved when a crystal (generally weighing one or two milligrams) dissolves in water. The method may have applications to other problems.

One or two square cover-slips are cemented on to each end of a microscope slide so as to form raised steps. A thin glass plate (this should be thicker than a cover-slip, in order to prevent bending under surface-tension forces) can be placed across these steps, so that a narrow space (0·3 mm. thick in our apparatus) is left between it and the central part of the microscope slide. The solid sample is placed in the middle of this central area and covered with the glass plate. From a pipette a quantity of water, pre-determined to be just sufficient to fill the space between the slide and the glass plate, is then squirted quickly into this space. The space fills before any appreciable amount of the sample dissolves. As dissolution takes place, the evolved gas forms bubbles between the slide and glass plate. By tilting the slide it is not difficult to induce the bubbles to coalesce to a single circular bubble. The diameter of this is then measured with a travelling microscope, the figure giving, in conjunction with the thickness of the space, the volume of gas. The solution can then be washed off the slide and glass plate, to be analysed in order to determine the amount of the sample, if this is not already known.

The effect of surface tension on the pressure within the bubble is difficult to correct for under practical conditions, but is not significant when an accuracy of the order of 2 or 3 per cent is aimed at.

H. G. Heal

Chemistry Department,
University College of the West Indies,
Mona, Jamaica.
Jan. 30.

Arginine and Deoxyribonucleic Acid Content of Erythrocyte Nuclei and Sperms of some Species of Fishes

The importance of arginine as a component of the chromatin in nuclei has been known for a long time. This amino-acid has even been considered as a possible 'bond' between the deoxyribonucleic acid (DNA) and the protein because it is so characteristic of all nucleoproteins. If it is so, there should be a relationship between individual amounts of the acid and of arginine in nuclei—provided that nuclei contain no arginine additional to that linked to deoxyribonucleic acid. We have therefore studied the individual amounts of arginine in some nuclei and sperms, compared with the nucleic acid content in the same material.

Material and methods. We worked with seven species of fishes; we used erythrocytes of tench, pike, roach and perch, in which the amount of deoxyribonucleic acid per nucleus is common to a number of fish, and trout, carp and barbel, in which this value is markedly higher[1]. For comparison we used the erythrocyte nucleus of a bird (domestic fowl) and the thymus nucleus of a mammal (calf). We assume that the amount of arginine found in the whole erythrocyte nucleus is approximately the same as that in the chromatin itself; these nuclei are very small and dense, and the quantity of arginine which could be present in the nuclear sap would be negligible.

Erythrocyte nuclei were isolated by a technique described previously[2]. As regards sperms, the measurements were made on whole mature sperms. Cytochemical observations showed that the arginine is chiefly localized in the sperm head; if there is arginine in the intermediate part, the error would not be important. Arginine was estimated by the colorimetric technique of C. Dumazert and R. Poggi[3].

From the results reported in the accompanying table, we see that the ratio of deoxyribonucleic acid content of all the erythrocyte nuclei studied and of some of the fish sperms to the arginine content in

Individual Amounts of Arginine and Deoxyribonucleic Acid (in 10^{-6} γ) of Erythrocyte Nuclei and Fish Sperms

Species	Erythrocytes DNA	Arginine	DNA/Arginine	Sperms DNA	Arginine	DNA/Arginine
Perch	2·0	0·37	5·4			
Barbel	3·4	0·64	5·3			
Roach	1·9	0·36	5·3			
Tench	1·7	0·34	5·0	0·85	0·18	4·77
Carp	3·2	0·60	5·3	1·60	0·35	4·40
Trout	4·9	0·96	5·1	2·45	1·50	1·63
Pike	1·7	0·34	5·0	0·85	0·53	1·60
Fowl	2·2	0·45	4·9			
	Calf thymus					
Bull	6·4	1·49	4·3	3·20	2·16	1·48