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CONSUMPTION AND METABOLIC RATES OF
SOME LEAF-EATING, CHEWING ARTHROPODS:
A SUMMARIZED LITERATURE REVIEW

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ABSTRACT

A table, comprised of consumption rates and metabolic rates of selected phytophagous chewing arthropods, is presented. The data were derived from a literature review and are primarily intended for the information of the modellers and others interested in approximate values of these parameters.

DISCUSSION AND SUMMARY

Table 1 is the result of a literature search undertaken by the author in May 1971. As can readily be seen, the list is a rather short one, both in terms of numbers of species studied and amounts of energy-flow information per species. The brevity of this table is closely correlated to the lack of good, quantitative studies concerned with the relationships between grassland ecosystems and the arthropod components contained therein. The capability and knowledge to perform such ecosystem-oriented entomological research have only recently been added to the repertoire of research methods available to invertebrate zoecologists. To emphasize this point, it may be noted that no articles containing information concerning respiration or metabolic rates could be located in literature published prior to 1960. There are also no published data relating to insect consumption or metabolic rates available from any of the U.S. IBP Biome Projects.

The completeness of Table 1 is restricted, perhaps significantly, by the quantity of scientific journals, primarily from outside the North American continent, which could not be located. Therefore, a few leads or sources which potentially had useful information could not be tracked down and, hence, are not included in the table.

The results reached by most of the authors referenced in Table 1 are in general agreement with each other. They are also in fairly good agreement with available figures concerning both large mammals (Cook 1970) and small mammals (Hansen and Cavender 1970) found on grasslands.

Table 1. The biomass energetics of leaf-eating arthropods in terrestrial ecosystems.

Species or Group	Dry Wt. (g)	Density (m ⁻²)	Food Intake		O ₂ Consumption (ml/g/hour)	Reference
			kcal/g/day	g/g/day		
<i>Anabrus simplex</i>	.2	10		.45		Cowan and Shipman 1947
<i>Chorthippus parallelus</i>	.04	15	.27		2.4	Gyllenberg 1969
<i>Melanoplus biliterratus</i> (nymph)			.59			Smith 1959
<i>Melanoplus</i> spp.	.005-.1	.4-2.8	.04-.24		2.8	Wiegert 1965
<i>Oecanthus</i> sp.	.009			.81		Reichle and Crossley 1967
<i>Orchelimum fidicinum</i>	.004-.1	3.2	.74		2.6	Smalley 1960
<i>Schistocerca gregaria</i> (adult)	1.5-2.0*			.4		Davey 1954
<i>Schistocerca gregaria</i> (juvenile)	.15*			1.0		Davey 1954
<i>Schistocerca americana</i>	.12	1.6	.44		2.5	Odum, Connell, and Davenport 1962
Grasshopper (large)	.10	20		.30		Parker 1952
<i>Chrysomela knabi</i> (larvae)	.005			.72		Crossley 1966
<i>Phegathontius</i> sp. (larvae)				.34		Wolcott 1937
<i>Prodenia eridania</i>	.008			2.3		Soo Hoo and Fraenkel 1966
<i>Bombyx mori</i>	.045			1.5		Soo Hoo and Fraenkel 1966
Crickets, in general	.27*	12				Gillon and Gillon 1967
Caterpillars, in general	.85*	7				Gillon and Gillon 1967

* Data given in wet weight.

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