TECHNICAL NOTES

The Literature of Range Science Based on Citations in the *Journal of Range Management*

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Abstract

Literature citations in the *Journal of Range Management (JRM)* were used to indicate and evaluate the various sources of range science literature. Authors in the *JRM* are presently (1976-1977) obtaining 51.2% of their reference citations from periodical literature, 18.9% from monographic series, 13.0% from books, and 7.3% from regular proceedings, annals, and reviews. Of the total citations made to periodical articles, 27.8% are from the *JRM* itself with *Ecology*, *Weed Science*, *Agronomy Journal*, *Journal of Wildlife Management*, and *Journal of Forestry* ranked next (6.9 to 2.2%). *JRM* authors are citing primarily U.S. sources of literature (86%), and *JRM* articles are averaging 13.3 citations per article (1976-1977).

The literature of range science is voluminous but widely scattered through an assortment of journals, monographs, monographic series, symposium proceedings, etc. In a recent bibliography of North American range science literature (Valentine 1978) covering the years 1935-1977, 20,500 literature items were selected as relating primarily to range science. But no attempt was made to classify objectively these entries as to sources.

This study was made to determine the relative significance of various forms and sources of literature being used by range scientists. Literature cited by authors in the *JRM* was used as evidence bearing upon this question. Knowledge of the major sources of range science literature should be of value not only to range scientists and managers but to all others interested in range science as well.

Methods

Three periods of time were arbitrarily selected for examination of

sources of literature cited in articles in the *Journal of Range Management*: 1948-1951, 1962-1963, and 1976-1977. Each period was represented by 12 issues of *JRM* respectively: (1) early period—the first 12 issues, 1(1), 2(1-4), 3(1-4), 4(1-3); (2) intermediate period, 15(1-6), 16(1-6); and present period, 29(1-6), 30(1-6). All feature articles, technical notes, and management notes were included, but editorials, presidential addresses, and viewpoints were excluded from consideration.

All literature citations made in these 36 issues of *JRM* were classified on the basis of country of publication (U.S., Canada, and foreign) and on literature form. The following forms of literature were included:

Monograph—a systematic and complete treatise on a single subject in printed form; distinguished by a unity of subject matter and independence from any other work; includes symposium proceedings and reviews of progress not part of a series.

Book—a monograph of 100 pages or more, includes textbooks, reference books, manuals, etc.

Pamphlet—a monograph of less than 100 pages.

Serial—a printed publication issued in successive parts bearing common numerical, chronological, or titular designations; generally intended to be continued indefinitely; associations of articles or monographs.

Periodical—a serial with distinctive title and intended to appear at regular intervals, more frequently than annual, and for an indefinite time period; each issue or part contains topical articles; issues combined into numbered or annual volumes.

Monographic series—a serial comprised of monographic units issued in uniform style under a collective title; units issued at irregular intervals and numbered consecutively but not combined into volumes; commonly issued by federal and state governments but also by private organizations.

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Manuscript received February 6, 1978.

Regular proceedings, annual and reviews—a serial issued regularly on an annual or less frequent basis; includes conference transactions, symposium proceedings, and review of progress issued regularly.

Unprinted literature—any literature not printed by any of various mechanical processes (excluding mimeograph, ditto, etc.), and thus generally of only limited distribution.

Dissertations and theses—extended, generally unpublished treatments of a subject submitted to meet requirements of an advanced degree.

Unpublished manuscripts—a handwritten or typewritten (also mimeographed, dittoed, or other temporary reproduction) composition or document as distinguished from printed copy; (here) excluding dissertations and theses; including notebooks, diaries, memoranda, company files, unpublished training manuals, etc.

Personal communications—data obtained directly from another person by letter or oral communication.

Miscellaneous—includes newspapers, maps, patents, and sources not otherwise classifiable.

Results and Discussion

Table 1 shows that 51.2% of current literature citations (1976-1977) in *JRM* were taken from periodical literature, with serial literature comprising a total of 77.4%. Monographic series (18.9%), books (13.0%), and regular proceedings, annals, and reviews (7.3%) ranked second, third, and fourth. Dissertations and theses (3.8%), unpublished manuscripts (2.6%), and pamphlets (1.7%) were used rather infrequently, and personal communications (0.1%) were used almost not at all as documented sources of information.

Trends between the three periods are also revealing. The emphasis on periodicals increased from 1948-1951 (35.8%) to 1962-1963 (55.0%) and 1976-1977 (51.2%) while the use of monographic series decreased from 41.3% to 22.1% and 18.9% respectively. These inverse trends probably indicate the increasing popularity and pro-

Table 1. Forms of literature cited by authors in the *Journal of Range Management*.

Forms of literature	1948-1951	1962-1963	1976-1977
Monographs			
Books	6.8	9.0	13.0
Pamphlets	2.1	1.6	1.7
Total	8.9	10.6	14.6
Serials			
Periodicals	35.8	55.0	51.2
Monographic series	41.3	22.1	18.9
Regular proceedings, annals, reviews	5.3	8.8	7.3
Total	82.4	85.9	77.4
Unprinted literature			
Dissertations and theses	.5	0.0	3.8
Unpublished manuscripts	6.2	1.8	2.6
Personal communications	0.0	0.0	.1
Total	6.6	1.8	6.4
Miscellaneous	2.1	1.7	1.6

liferation of periodicals and possibly also inadequate indexing and abstracting of state and federal monographic series as compared to intensive indexing of periodicals. Trends can also be noted towards increasing use of book monographs and regular proceedings, annals, and reviews; both of these two forms of literature include symposium proceedings, an increasingly important source of range science literature.

Hein (1967) tabulated the literature cited in volumes 28-30 (1964-1966) of the *Journal of Wildlife Management*. He found that 72.9% of the literature citations were from serials, 13.1% from monographs, 5.8% from unpublished materials, 4.2% from theses, and 3.9% from other sources. Twenty-four percent of all periodical citations in *JWM* were to *JWM* itself, and 50% of periodical citations were taken from the 16 most-cited periodicals.

Table 2. Ranking of periodicals cited by authors in the *Journal of Range Management*.

1948-1951			1962-1963			1976-1977		
	No. ¹	% ²		No. ¹	% ²		No. ¹	% ²
Agron. J.	32	20.4	J. Range Manage.	129	25.9	J. Range Manage.	471	27.8
Ecology	30	19.1	Agron. J.	73	14.7	Ecology	117	6.9
J. Forest	21	13.4	Ecology	38	7.6	Weed Sci.	111	6.9
Ecol. Monogr.	16	10.2	J. Anim. Sci.	25	5.0	Agron. J.	85	5.0
J. Range Manage.	15	9.6	J. Forest.	18	3.6	J. Wildl. Manage.	81	4.8
Cattleman	7	4.5	Ecol. Monogr.	13	2.6	J. Anim. Sci.	59	3.5
J. Agr. Res.	6	3.8	J. Agr. Res.	12	2.4	J. Forest	37	2.2
Calif. Fish & Game	4	2.5	Weed Sci.	10	2.0	J. Brit. Grassland Soc.	32	1.9
J. Dairy Sci.	3	1.9	Soil Sci. Soc. Amer.			Ecol. Monogr.	30	1.8
Plant Phys.	3	1.9	Proc. (Jour.)	9	1.8	Soil Sci. Soc. Amer.	28	1.7
Science	2	1.3	Empire J. Exp. Agr.	8	1.6	J. (Proc.)		
Agr. Eng.	2	1.3	Can. J. Plant Sci.	8	1.6	Soil Science	24	1.4
Amer. Here. J.	2	1.3	J. Wildl. Manage.	8	1.6	Amer. J. Vet. Res.	19	1.1
Utah Juniper	2	1.3	Science	6	1.2	Crop Sci.	18	1.1
Southwestern Sheep and Goat Raiser	2	1.3	Calif. Agr.	6	1.2	Can. J. Plant Sci.	17	1.0
Amer. Cattle Prod.	2	1.3	Plant Phys.	6	1.2	Phytochemistry	16	.9
Muhlenbergia	2	1.3	Soil Sci.	5	1.2	J. Ecol.	15	.9
Soil Conserv.	2	1.3	Aust. J. Sci. Res.	4	.8	Plant Phys.	13	.8
Bot. Gaz.	2	1.3	J. Nutr.	4	.8	Aust. J. Exp. Agr. and Anim. Husb.	12	.7
			Queensland J. Agr. Sci.	4	.8	Can. J. Anim. Sci.	12	.7
			Soil Conserv.	4	.8	Bot. Gaz.	11	.7
			J. Ecol.	4	.8	Amer. J. Bot.	11	.7
			Hilgardia	4	.8	Northwest Sci.	11	.7
			Bot. Rev.	4	.8	Bot. Rev.	11	.7
						Amer. Midl. Natur.	11	.7
						J. Agr. Res.	11	.7

¹ Number of times cited in 12 issues.

² Percent of all periodical citations. Listings in table limited to periodicals of .7 percent or more.

The relative importance of various periodicals in range science as based on citations in *JRM* is shown in Table 2. During the early period (1948-1951) when *JRM* was in its infancy, the top five periodicals being used were respectively *Agronomy Journal* (then called *Journal of the American Society of Agronomy*), *Ecology*, *Journal of Forestry*, *Ecological Monographs*, and the *Journal of Range Management*. It is readily apparent that the first four periodicals were used intensively for the publication of range management articles before *JRM* was begun. However, these four journals also remained prominent in *JRM* citations in the 1962-1963 and 1976-1977 periods. Journals that greatly increased in *JRM* citations during the latter two periods were *Journal of Animal Science*, *Weed Science*, and *Journal of Wildlife Management*.

Self-citations in *JRM* during 1962-1963 comprised 25.9 and 27.8% respectively of all periodical citations, with the six most-cited journals providing 54.9% of periodical citations in 1976-1977. Science Citation Index (1975, 1976) reported similar results for the 1974-1975 years when 27.8% of the periodical citations in *JRM* were self-citations and 45.6% of all periodical citations in *JRM* were taken from the five most-cited journals. It was also reported in this Index that during the year 1975 *JRM* was cited in 119 journals for a total of 468 times; 53.6% of the citations to *JRM* was made in *JRM*, 6.0% in *Journal of Animal Science*, 5.1% in *Journal of Wildlife Management*, 4.1% in *Agronomy Journal*, 3.8% in *Canadian Journal of Plant Science*, and 3.2% in *Ecological Monographs*.

The present study also revealed that authors in *JRM* primarily cited—and thus presumably primarily used for their sources of information—U.S. publications, i.e. 94.7% in 1948-1950, 88.5% in 1962-1963, and 86.5% in 1976-1977 (Table 3). This suggestion of increasing use of foreign literature by U.S. authors in *JRM* may be partly misleading; this increase in citation of foreign literature may primarily represent an increasingly greater number of foreign authors publishing in *JRM*.

From a study made of 1972 citations in agronomy journals, Lawani (1977) found that American agronomists cited American publications 74.9% of the time and English-language publications 97.7% of the

Table 3. Literature citations in the *Journal of Range Management* based on place of publication.

Country of Publication	1948-1951	1962-1963	1976-1977
	%	%	%
U.S.	94.7	88.5	86.0
Canada	1.1	2.8	2.5
Foreign	4.1	8.7	11.5

time. He concluded that agronomists in America overlook relevant and potentially valuable literature published in other parts of the world and that language was the responsible factor.

Finally, the present study revealed that the number of articles per issue of *JRM* increased from 7.13 in 1948-1950 to 10.0 in 1962-1963 and to 20.75 in 1976-1977, suggesting an increase in the stature of *JRM* amongst researchers and other authors as well as accelerated interest and activity in range science. It was also found that the number of references cited per article in *JRM* has materially increased (5.1 in 1948-1950, 7.6 in 1962-1963, to 13.3 in 1976-1977), suggesting greater emphasis on documentation in recent years by *JRM* authors.

Literature Cited

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