Pacific Southwest Forest and Range
Experiment Station - Berkeley, California
Forest Service - U. S. Department of Agriculture

U. S. FOREST SERVICE RESEARCH NOTE PSW-N20 1963

ELECTRONIC DATA PROCESSING CODES FOR CALIFORNIA WILDLAND PLANTS

By
Merton J. Reed, W. Robert Powell,
and Bur S. Bal[1/]

Systematized codes for plant names are helpful to a wide variety of workers who must record the identity of plants in the field. We have developed such codes for a majority of the vascular plants encountered on California wildlands and have published the codes in pocket size, using photo-reductions of the output from data processing machines. A limited number of the pocket-guides is available for distribution to field workers from the Director, Pacific Southwest Forest and Range Experiment Station, P. O. Box 245, Berkeley 1, California.

Our purpose in preparing this pocket guide was to provide in convenient form for the fieldman, systematized codes for rapidly recording in a small space the identity of plants encountered on California wildlands. At the same time we wanted codes that were adapted to modern data processing equipment. We also decided to code supplemental information for each plant on: (1) its appropriate grouping--e.g., grasses, forbs, woody shrubs, etc.--and (2) its usual longevity class.

The codes should be especially useful to persons working with large segments of the State's flora. They are particularly adaptable for handling data from large scale, inclusive vegetation inventories, and for coordinating records taken over a number of years or among projects. Persons working with only a few species or with the plants of a restricted locality will find it advantageous to develop systems of shorter codes for field recording. The shorter codes may be matched with the listed number codes for more easily combining data among projects or incorporating them into larger inventories.

1/ Respectively, Research Project Leader, Pacific Southwest Forest and Range Experiment Station, Forest Service, U.S. Department of Agriculture, Berkeley, California; Assistant Specialist, Department of Agronomy, University of California, Davis, California; and formerly Technician, Department of Agronomy, University of California, Davis, California.

PLANTS INCLUDED

All plant names recognized as valid in A California Flora[2] were included in the guide, except for most forms. About 30 names of plants commonly being used for reseeding California wildlands were added.

Because identification of a plant is sometimes possible or necessary only to the genus level, provision also was made for recording unidentified species of the genera listed. Users of the code system should recognize that these codes are not for the genera themselves.

In selecting this list of plant names, especially in excluding common synonyms, we recognized that the guide would not be as complete as some might desire. But our purpose was to make available as a start a fairly complete list that could be expanded and refined.

PLANT IDENTITY CODES

Two kinds of codes are provided for each plant: a letter code and a number code (fig. 1). The letter code, which appears first, at the left side of the page in the lists, is the only code intended to be used by fieldmen and card punchers. The number codes are intended solely for machine use.

Recognized species, subspecies, varieties, or other subdivisions are treated as individual entities. No effort was made to distinguish between levels of the third names listed. A third name may be any of the following: Subspecies, variety, variety of a subspecies (in such cases, the subspecies name was omitted), form, or improved strain in the case of commercially recognized strains of forage plants.

THE LETTER CODE

The letter code, technically the alphanumeric code, is based on the scientific name of the plant. We felt strongly, as did Garrison and Skovlin in their similar Northwest plant symbol list,[3] that letter codes, derived from plant names, the usual--and natural-- practice in the past,[4] far outweigh in their recall value for the trained botanist any disadvantage in processing.

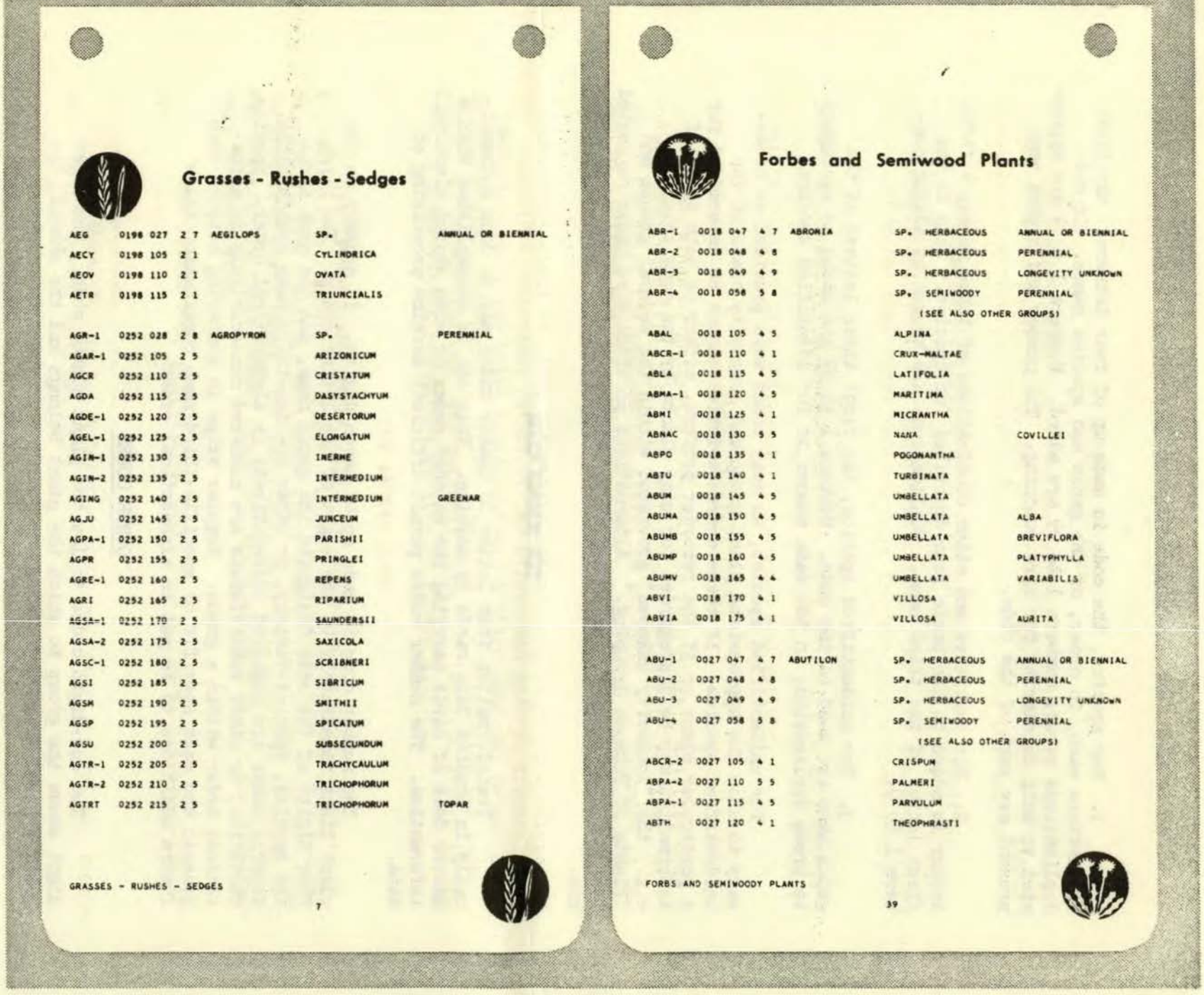
The letter code varies from three to six characters according to three rules:

---

[2] Munz, Philip A. A California Flora. Berkeley and Los Angeles: Univ. Calif. Press, 1681 pp., illus. 1959.

[3] Garrison, George A., and Skovlin, Jon M. Northwest range-plant symbols adapted to automatic data processing. U.S. Forest Serv. Pacific NW. Forest & Range Expt. Sta. Res. Paper 35, 143 pp., 1960.

[4] Jensen, Herbert A. A system for classifying vegetation in California. Calif. Fish and Game 33(4): 199-266, illus. 1947.



Grasses - Rushes - Sedges

AEG	0198 027	2 7	AEGILOPS	SP.	ANNUAL OR BIENNIAL
AECY	0198 105	2 1		CYLINDRICA	
AEOV	0198 110	2 1		OVATA	
AETR	0198 115	2 1		TRIUNCIALIS	
AGR-1	0252 028	2 8	AGROPYRON	SP.	PERENNIAL
AGAR-1	0252 105	2 5		ARIZONICUM	
AGCR	0252 110	2 5		CRISTATUM	
AGDA	0252 115	2 5		DASYSTACHYUM	
AGDE-1	0252 120	2 5		DESERTORUM	
AGEL-1	0252 125	2 5		ELONGATUM	
AGIN-1	0252 130	2 5		INERME	
AGIN-2	0252 135	2 5		INTERMEDIUM	
AGING	0252 140	2 5		INTERMEDIUM	GREENAR
AGJU	0252 145	2 5		JUNCEUM	
AGPA-1	0252 150	2 5		PARISHII	
AGPR	0252 155	2 5		PRINGLEI	
AGRE-1	0252 160	2 5		REPENS	
AGRI	0252 165	2 5		RIPARIUM	
AGSA-1	0252 170	2 5		SAUNDERSII	
AGSA-2	0252 175	2 5		SAXICOLA	
AGSC-1	0252 180	2 5		SCRIBNERI	
AGSI	0252 185	2 5		SIBIRICUM	
AGSM	0252 190	2 5		SMITHII	
AGSP	0252 195	2 5		SPICATUM	
AGSU	0252 200	2 5		SUBSECUNDUM	
AGTR-1	0252 205	2 5		TRACHYCAULUM	
AGTR-2	0252 210	2 5		TRICHOPHORUM	
AGTRT	0252 215	2 5		TRICHOPHORUM	TOPAR

Forbes and Semiwood Plants

ABR-1	0018 047	4 7	ABRONIA	SP. HERBACEOUS	ANNUAL OR BIENNIAL
ABR-2	0018 048	4 8		SP. HERBACEOUS	PERENNIAL
ABR-3	0018 049	4 9		SP. HERBACEOUS	LONGEVITY UNKNOWN
ABR-4	0018 058	5 8		SP. SEMIWOODY	PERENNIAL
				(SEE ALSO OTHER GROUPS)	
ABAL	0018 105	4 5		ALPINA	
ABCR-1	0018 110	4 1		CRUX-MALTAE	
ABLA	0018 115	4 5		LATIFOLIA	
ABMA-1	0018 120	4 5		MARITIMA	
ABMI	0018 125	4 1		MICRANTHA	
ABNAC	0018 130	5 5		NANA	COVILLEI
ABPO	0018 135	4 1		POGONANTHA	
ABTU	0018 140	4 1		TURBINATA	
ABUM	0018 145	4 5		UMBELLATA	
ABUMA	0018 150	4 5		UMBELLATA	ALBA
ABUMB	0018 155	4 5		UMBELLATA	BREVIFLORA
ABUMP	0018 160	4 5		UMBELLATA	PLATYPHYLLA
ABUMV	0018 165	4 4		UMBELLATA	VARIABILIS
ABVI	0018 170	4 1		VILLOSA	
ABVIA	0018 175	4 1		VILLOSA	AURITA
ABU-1	0027 047	4 7	ABUTILON	SP. HERBACEOUS	ANNUAL OR BIENNIAL
ABU-2	0027 048	4 8		SP. HERBACEOUS	PERENNIAL
ABU-3	0027 049	4 9		SP. HERBACEOUS	LONGEVITY UNKNOWN
ABU-4	0027 058	5 8		SP. SEMIWOODY	PERENNIAL
				(SEE ALSO OTHER GROUPS)	
ABCR-2	0027 105	4 1		CRISPUM	
ABPA-2	0027 110	5 5		PALMERI	
ABPA-1	0027 115	4 5		PARVULUM	
ABTH	0027 120	4 1		THEOPHRASTI	

Figure 1.--Sample pages from pocket edition of this note which includes codes for a majority of the vascular plants on California wildlands.

1. For species, the code is made up of four letters: the first two letters each, in order, of the genus and species names. If code duplications occur, numbers 1 to 99 are added. Numbers 1 to 9 are hyphenated to help in clarity for card punching. The number and hyphen when present are part of the code.

2. For varieties and other combinations of three names, a fifth letter is added to the basic four described for species. This is the first letter of the third name. Duplications are broken by adding numbers 1 to 9.

3. For unidentified species, the first three letters of the genus name are used in the code. Numbers 1 to 99 are added as necessary to break duplications in the same manner as for identified species.

For unidentified species, as many codes were provided as necessary to show the appropriate plant group and longevity class of the unidentified species. If these characteristics cannot be determined for a particular plant or if the recorder prefers, either or both types of information may be disregarded for many plants by the code selected, e.g., the "longevity unknown" provision within the several groups and "Plants of Unknown Grouping." Alternatives provided were those suggested by the listed species, varieties, etc., reported as occurring in California.

THE NUMBER CODE

Transformation from letter to number codes may be done automatically in punched data cards by machine. This can be accomplished with a master deck of cards carrying the matched codes or with stored electronic information. The number codes permit efficient machine processing of data.

The number code is made up of seven digits. It appears in the plant lists immediately to the right of the letter codes. The first four digits of the code designate the genus name, and the next three the species, species-variety, or other species-third-name combinations. Generic names are numbered consecutively in alphabetical order. Species, varieties, or other subdivisions are numbered consecutively in alphabetical order within a genus. Regular skips in numbering between each generic and each specific or specific-third-name combination allow future additions to be put in alphabetical order.

OTHER CODES

Two one-digit codes follow the plant number code. The first digit shows the group to which the plant belongs and the second, the plant's usual longevity class.

These codes may be used or omitted without destroying the value of the plant identity codes.

PLANT GROUPS

Nine groups of plants were arbitrarily recognized in developing this guide. These and their accompanying codes are given below. Certain divisions were along taxonomic lines and others corresponded to differences in usual growth habit of the plants. Some were based on both criteria. Information on growth habit for most plants was taken from descriptions in A California Flora.

Group	Code	Group	Code
Lower plants	1	Woody shrubs	6
Grasses	2	Broadleaf trees	7
Rushes and sedges	3	Coniferous trees	8
Forbs	4	Plants of unknown grouping	9
Semiwoody plants[1/]	5		

[1/] Includes plants having a caudex, as the minimum degree of woodiness.

The last group--plants of unknown grouping--provides an alternative code for unidentified species of certain genera, where the listed plants occurring in California include species of different growth habits. For example, an unidentified species of oak can be coded under "woody shrubs," "broad-leaved trees," or "plants of unknown grouping."

In the guide, certain of the plant groups recognized have been listed together for convenience of the user.

LONGEVITY CLASSES

Assignment to a longevity class was according to what we considered usual for the plant. For most plants this was based on descriptions in A California Flora. Five classes were recognized:

Class	Code	Class	Code
Annual	1	Short-lived perennial	4
Biennial	2	Long-lived perennial	5
Annual or biennial	3		

For unidentified species, three broad classes with their own codes were set up. Alternatives provided in each case were those suggested by the known plants listed. Classes and codes are:

Class	Code
Annual and/or biennial	7
Perennial	8
Longevity unknown	9

PERMANENCY OF CODES

The plant-identity number codes should be considered permanent for the plants included. Once a number code is assigned to a particular plant, it should never be changed. Synonyms should be tied to the same number code. On the other hand, additional letter codes may be added as desired to correspond with synonymous names.

Following this course seems desirable even though at some future date it may interfere with direct sorting by genera. In developing this guide, we considered provisions for this type of sorting a desirable by-product but one that could be sacrificed if necessary.

CORRECTIONS AND ADDITIONS

In a work of this kind errors and omissions are bound to occur. Although regular revision or updating of this guide is not planned at this time, suggestions, comments, and notes on additions and errors will be welcome. They should be sent to Director, Pacific Southwest Forest and Range Experiment Station, P. O. Box 245, Berkeley 1, California.

ACKNOWLEDGMENTS

We gratefully acknowledge the suggestions and advice of a number of persons concerning the preparation of this handbook. We especially thank Robert M. Miller, Mrs. Yoshiko Ishizawa, and C. Eugene Conrad, Pacific Southwest Forest and Range Experiment Station, Forest Service, U.S. Department of Agriculture, whose continuing personal interest and unstinting advice and help in the field of electronic data processing made its completion possible. A special note of thanks also is due Dr. Philip A. Munz for the timely appearance of his comprehensive A California Flora, which was used as the principal source of the plants included.

This work was supported in part by the State Soil-Vegetation Survey, a cooperative project of the California Division of Forestry, the University of California Division of Agricultural Sciences, and the Pacific Southwest Forest and Range Experiment Station.

PROCESSING AND DECODING

Copies of the master card deck of coded information are available from the Director, Pacific Southwest Forest and Range Experiment Station.