

DEPARTMENT OF THE INTERIOR

U.S. GEOLOGICAL SURVEY

PALYNOLOGY OF THE CURRANT CREEK AND MESAVERDE FORMATIONS  
IN THE CURRANT CREEK-DUCHESNE RIVER AREA,  
DUCHESNE AND WASATCH COUNTIES, UTAH

by

Douglas J. Nichols and Bruce Bryant

U.S. Geological Survey <sup>1</sup>

Open-File Report 86-160

This report is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards and stratigraphic nomenclature.

<sup>1</sup> Denver, Colorado 80225

## CONTENTS

Introduction .....	2
Appendix 1. Species location index .....	5
Appendix 2. Description of palynomorph localities .....	6
Figure 1. Palynomorph occurrences in Currant Creek and Mesaverde Fms. ....	4

## INTRODUCTION

This report lists occurrences of palynomorphs recovered from samples of the lower part of the Currant Creek Formation and the underlying Mesaverde Formation collected from outcrops in northeastern Utah (Figure 1 and Appendix 1). Data on the sample localities are included (Appendix 2). The purpose of the study was to obtain biostratigraphic evidence on the age of the synorogenic Currant Creek Formation and on the magnitude of the temporal hiatus represented by the unconformity separating the Mesaverde and Currant Creek Formations. Collections were made during fieldwork associated with geologic mapping of the Salt Lake City 1:250,000 quadrangle (Bryant, in prep.). Age determinations are based on the zonation defined by Nichols and others (1983).

Palynomorphs are difficult to recover from the Currant Creek beds, which are generally coarse grained and oxidized. Scarce beds of gray clay interbedded with pink sandstone and conglomerate yielded sparse assemblages of palynomorphs. In the area of study, the Currant Creek has a maximum thickness of 1460 m. Only samples collected from within about 100 m of the base of the formation proved to be productive, and thus only the lower part of the formation has been dated.

An unconformity that cuts down section to the east separates the Currant Creek from the underlying Mesaverde, hence the Mesaverde is variable in thickness in the area of study, ranging from 1574 m at Currant Creek to 168 m at the Duchesne River. The Mesaverde was sampled from beds near its base that are transitional to the underlying marine Mancos Shale, and from coal-bearing beds near the top of the formation.

A total of 48 palynomorph taxa were recorded from samples analyzed in this study; the taxa recorded include individual species and genera with one or more species. The total includes 10 taxa of marine origin that were found only in one sample from the basal part of the Mesaverde Formation. In addition to the marine taxa (dinocysts and acritarchs), 20 taxa of nonmarine palynomorphs appear to be restricted to the Mesaverde; of these, 5 are angiosperms, 6 are gymnosperms, and 9 are pteridophytes. For some of these taxa, restriction in occurrence may be more an artifact of the limited number of samples analyzed in this study than a reflection of their total range. The composite assemblage from Currant Creek samples includes 18 taxa, of which 8 appear to be restricted, and in fact at least 6 of these are unknown in rocks of Mesaverde age, regionally.

The basal part of the Mesaverde Formation at locality D6132 yielded both marine and nonmarine palynomorphs, and on the basis of the assemblage recovered (Figure 1), these beds can be assigned to both the *Chatangiella* Interval Zone (marine) and the largely correlative *Proteacidites retusus* Interval Zone (nonmarine). Coal and carbonaceous claystone from localities D6438-A and D6438-B in the upper part of the Mesaverde yielded entirely nonmarine assemblages characteristic of the *P. retusus* biozone. An age

range of Coniacian through Santonian is thus indicated for the Mesaverde Formation in the area of study.

Samples from the Currant Creek Formation yielded nonmarine palynomorphs of Late Cretaceous age. The collective assemblage from these samples is characteristic of the upper part of the *Aquilapollenites quadrilobus* Interval Zone (= *A. reductus* informal subzone), which has an age range of latest Campanian through early Maestrichtian. Samples were collected from the upper part of the formation, but all of these proved to be barren of palynomorphs. Consequently, the syntectonically derived Currant Creek Formation is no older than latest Campanian, but its minimum age has not been determined.

Palynomorphs characteristic of the *Pseudoplicapollis newmanii* and *Aquilapollenites senonicus* Interval Zones and the lower part of the *A. quadrilobus* Interval Zone (= *Siberiapollis montanensis* informal subzone) are absent from samples analyzed in this study. The time interval represented by the missing biozones is about 9 Ma. The Mesaverde beds sampled are not necessarily in the uppermost part of the *Proteacidites retusus* biozone, and similarly the dated Currant Creek beds are not necessarily at the base of the *Aquilapollenites reductus* subzone; therefore, 9 Ma is a minimum figure, and the palynological evidence indicates that the hiatus marked by the unconformity at the base of the Currant Creek Formation had a duration of 9 to 15 Ma.

Our sample localities (U.S.G.S. paleobotany localities) are identified by numbers with the prefix "D" (see Appendix 2). Microscope slides used in the analyses reported here, labeled with the appropriate locality numbers, are on file at the U.S. Geological Survey's Denver laboratory.

#### Reference Cited

- Nichols, D.J., Jacobson, S.R., and Tschudy, R.H., 1983, Cretaceous palynomorph biozones for the central and northern Rocky Mountain region of the United States, in: Powers, R.B., ed., Geologic studies of the Cordilleran thrust belt: Denver, Colorado, Rocky Mountain Association of Geologists, vol. 2, p. 721-733, pl. 1.

# Palynomorph occurrences in Currant Creek and Mesaverde Fms.

RANGE CHART OF PRESENCE/ABSENCE BY LOWEST APPEARANCE

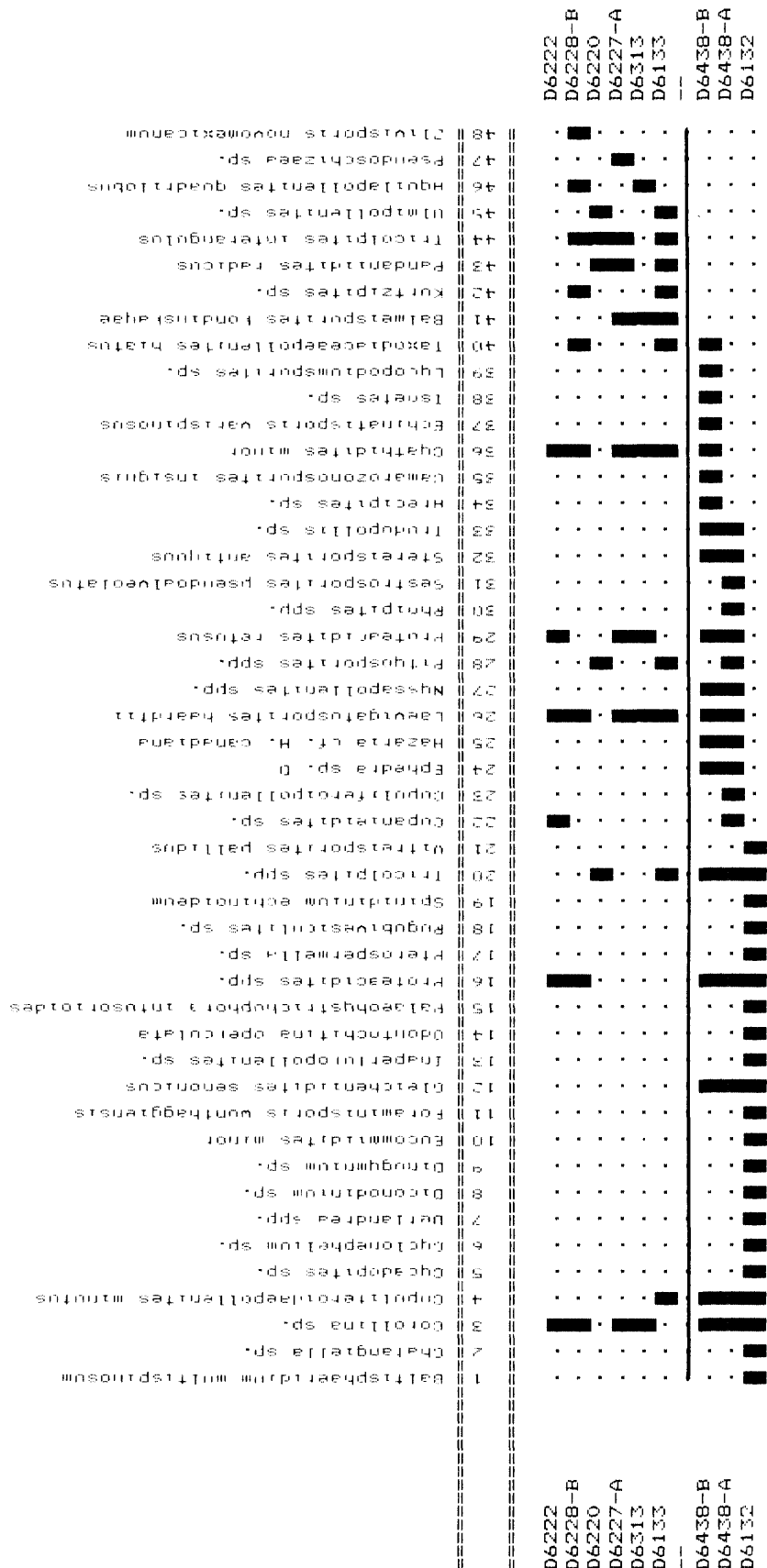


Figure 1. Palynomorph occurrences in Currant Creek and Mesaverde Fms. Currant Creek samples: D6133, D6313, D6227-A, D6220, D6228-B, D62

# SPECIES LOCATION INDEX

Index numbers are the columns in which species appear.

INDEX NUMBER	SPECIES
46	Aquilapollenites quadrilobus
34	Arecipites sp.
41	Balmeisporites kondinskayae
1	Baltisphaeridium multispinosum
35	Camarozonosporites insignis
2	Chatangiella sp.
3	Corollina sp.
22	Cupanieidites sp.
4	Cupuliferoidaepollenites minutus
23	Cupuliferoipollenites sp.
36	Cyathidites minor
5	Cycadopites sp.
6	Cyclonephelium sp.
7	Deflandrea spp.
8	Diconodinium sp.
9	Dinogymnium sp.
37	Echinatisporis varispinosus
24	Ephedra sp. D
10	Eucommiidites minor
11	Foraminisporis wonthaggiensis
12	Gleicheniidites senonicus
25	Hazaria cf. H. canadiana
13	Inaperturopollenites sp.
38	Isoetes sp.
42	Kurtzipites sp.
26	Laevigatosporites haardtii
39	Lycopodiumsporites sp.
27	Nyssapollenites spp.
14	Odontochitina operculata
15	Palaeohystrichophora infusorioides
43	Pandaniidites radicus
28	Pityosporites spp.
29	Proteacidites retusus
16	Proteacidites spp.
47	Pseudoschizaea sp.
17	Pterospermella sp.
30	Rhoipites spp.
18	Rugubivesiculites sp.
31	Sestrosporites pseudoalveolatus
19	Spinidinium echinoideum
32	Stereisporites antiquus
40	Taxodiaceaeipollenites hiatus
44	Tricolpites interangulus
20	Tricolpites spp.
33	Trudopollis sp.
45	Ulmipollenites sp.
21	Vitreisporites pallidus
48	Zlivisporis novomexicanum

## APPENDIX 2

### DESCRIPTION OF PALYNOMORPH LOCALITIES

#### CURRENT CREEK FORMATION

- D6222 Dark gray clay about 100 m above base of Currant Creek Formation. At 7060 ft altitude in gulley 1.89 km S 42° E of spot elevation 7104 on Farm Creek road; NW 1/4 SW 1/4 Sec. 16, T. 1 S., R. 7 W.; 40° 23' 29"; 110° 41' 16"; Duchesne County. Farm Creek Peak quadrangle. Collected by Bruce Bryant.
- D6228-B Dark gray clay about 80 m above base of Currant Creek Formation. At 7070 ft altitude in gulley 1.77 km S 57° E of road intersection 6939 on Farm Creek road; SE 1/4 NW 1/4 Sec. 17, T. 1 S., R. 7 W.; 40° 23' 38", 110° 42' 03"; Duchesne County. Farm Creek Peak quadrangle. Collected by Bruce Bryant.
- D6220 Dark gray clay from about 40 m above base of Currant Creek Formation. At 7200 ft altitude just east of gulley 2.22 km S 52° E of spot elevation 7104 on Farm Creek road; NE 1/4 SW 1/4 Sec. 16, T. 1 S., R. 7 W.; 40° 23' 29", 110° 40' 57"; Duchesne County. Farm Creek Peak quadrangle. Collected by Bruce Bryant.
- D6227-A Gray clay from lowest siltstone interval containing some light pinkish red beds about 20 m above base of Currant Creek Formation. At 7220 ft altitude in gulley 1.70 km S 61.5° E of road intersection 6939 in Farm Creek valley; SE 1/4 NW 1/4 Sec. 17, T. 1 S., R. 7 W.; 40° 23' 42", 110° 42' 05"; Duchesne County. Farm Creek Peak quadrangle. Collected by Bruce Bryant.
- D6313 Gray silty clay just below granule conglomerate bed in roadcut on Red Creek road 460 m south of north border of Tabby Mountain quadrangle, about 60 m above coal bed in the Mesaverde Formation (locality D6438) and 140 m below lowest cobble conglomerate in Currant Creek Formation; NW 1/4 NW 1/4 Sec. 26, T. 1 S., R. 9 W.; 40° 22' 14", 110° 52' 24"; Duchesne County. Tabby Mountain quadrangle. Collected by Bruce Bryant.
- D6133 Gray siltstone 20 m below lowest conglomerate in Currant Creek Formation. From 8720 ft altitude on southwest-facing nose of ridge south of Bear Hole Hollow, 1050 m N 55° E of Bear Hole; NW 1/4 NE 1/4 Sec. 33, T. 1 S., R. 10 W.; 40° 21' 14", 111° 01' 03"; Wasatch County. Jimmies Point quadrangle. Collected by Bruce Bryant.

## MESAVERDE FORMATION

- D6438-A Coal, grab sample from seam 5 m thick about 60 m below top of Mesaverde Formation, in open cut on east side of Red Creek at mine symbol at north boundary of Sec. 26, T. 1 S., R. 9 W.; 40° 22' 18", 110° 52' 23"; Duchesne County. Tabby Mountain quadrangle. Collected by D.J. Nichols and Bruce Bryant.
- D6438-B Gray clay parting near top of coal seam (locality D6438-A). Collected by D.J. Nichols and Bruce Bryant.
- D6132 Gray to brownish clay shale from 40 m above base of Mesaverde Formation in roadcut in new road around Currant Creek Reservoir, at 8080 ft altitude 360 m S 54° E of mouth of Jones Cabin Creek; SE 1/4 SW 1/4 Sec. 30, T. 1 S., R 10 W.; 40° 21' 35", 111° 03' 37"; Wasatch County. Jimmies Point quadrangle. Collected by Bruce Bryant.