Prehistoric Plant Use on Delaware's Coastal Plain: Archeobotanical Research at the Puncheon Run Site (7K-C-51)

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Recent research at the Puncheon Run Site (7K-C-51) has focused on exploring long-standing subsistence issues surrounding the definition of Woodland I and II settlements in Delaware. A comprehensive program of soil collection and flotation for the recovery of plant macrofossils undertaken during Phase II and Phase III investigations has yielded data that conforms to the inconclusive pattern of archeobotanical remains documented regionally.

The results of archeobotanical analysis are presented, problems with the data are explored and comparisons are made with floral assemblages from other Woodland sites on the coastal plain. The results of a 1998 ethnographic study on plant use by Native American groups are brought in to augment interpretation of existing models for plant resource utilization during the Woodland I and II. Site and regional archeobotanical data are examined against the backdrop of historically documented human-plant relationships.

INTRODUCTION

SLIDE (title) Throughout much of the middle-Atlantic region, patterns of wild plant exploitation and prehistoric horticulture have been defined and supported by flotation-recovered archeobotanical data. However, on the coastal plain of Delaware, the archaeological data relating prehistoric plant use have been elusive to archaeologists exploring subsistence and settlement during the Woodland I and Woodland II periods -- which span a very dynamic time in human-plant relations throughout the Eastern Woodlands.

SLIDE (text new) In an attempt to contribute to our understanding of paleoethnobotany in the region, recent Phase II and Phase III investigations at the Puncheon Run site placed considerable

emphasis on botanical research: Our approach included a comprehensive program of soil collection and flotation for the recovery of plant macro-remains. A vegetative survey and landscape assessment was made of the site, and a review of the ethnographic literature germane to native plant use in the Delaware River Region was also conducted.

Despite these studies, a definite understanding of human-plant interactions at this coastal-plain woodland-period settlement continue to elude us, but some interesting possibilities have been suggested by the research:

SLIDE (bulleted list) Our research suggests that Woodland-period occupations at PR consisted of seasonal encampments for the exploitation of marsh resources - particularly semi-submerged herbaceous plants with edible roots and tubers. Key factors in support of this hypothesis include the following:

- absence of significant durable food-plant remains in the archaeological record. Fleshy plant parts such as roots and tubers leave no discernable trace macro-botanically and have a weak phytolith signature making them extremely hard to identify

- presence of large, bell-shape pits which served an as-yet undefined purpose

- site location corresponds with regionally unique, economically important marsh plants

Finally, - ethnographic accounts of coastal Algonquian cultures describe the importance of a variety of marsh plant resources to native subsistence - and emphasize the mass harvest and storage of the edible roots and tubers of certain wetland species

DISCUSSION

I would like to give a quick overview of the flotation-recovered plant data, followed by some key points about the site environment and edible plant resources native to the project area, and h to offer some explanations for plant use @ PR based on the collective information derived archaeologically, ethnographically, and from reconstruction of prehistoric landscape at the site.

MACROBOT DATA

SLIDE (scope) Large-scale soil collection and flotation processing was undertaken for the recovery of plant macro-remains which were analyzed for clues to dietary practices, food processing and storage, and site environment.

SLIDE (text) Soil samples were taken during field excavations from cultural features, non-feature cultural contexts, and from non-culture bearing strata (as a control). Across the site, a total of 138 samples measuring 274 liters were collected: of these, 95 samples totaling 188 liters were submitted for flotation processing and analysis.

Soil samples were individually processed using a modified SMAP-type flotation system.

SLIDE (text) 73% of the analyzed samples yielded archeobotanical remains. Overall, carbonized plant remains were scant, and their condition was only fair, apparently as a result of abrasion and erosion in the coarse alluvial sediments characterizing the site.

Charcoal density per liter of soil averaged 0.19 grams across the site, with highest charcoal

concentrations occurring in samples secured from Locus 3, the lowest in samples secured from Locus 1.

A variety of culturally important wild plant remains were recovered - these include deciduous and coniferous wood, thick-walled hickory nutshell, acorn shells, carbonized seeds, abundant non-carbonized seeds, and other miscellaneous plant materials. The remains of cultivated plants were conspicuously absent from the Puncheon Run assemblage.

SLIDE (pie) Recovered wood charcoal from the site reveals the composition of local forests, and the preference for high-calorie fuel woods by prehistoric residents: This chart shows the relative abundance of wood taxa identified. The assemblage is dominated by a variety of oak species, hickory and sweetgum - all species identified are consistent with the pre-colonial forest cover of the area and the pattern of wood remains expected for Woodland I and W II flotation assemblages in the region.

SLIDE (nut) Nutshell remains were scant - although we might expect native mast to be abundant and accessible at PR - the heavy use of nut crops is not confirmed archeobotanically. This suggests that seasonal occupations at the Site were not focused on the collection, processing and storage of wild nuts.

Carbonized seed remains were recovered from Locus 3 - and although edible taxa were identified (including *Polygonum* and *Chenopodium* species), none of the seeds recovered exhibit any characteristics of cultivated types, nor were the found in concentrations which suggest their use

as food.

SLIDE (table) Non-carbonized seeds were abundant throughout all contexts sampled - cultural and non-cultural alike. This table illustrates the taxa identified and the non-native status of many recovered species. The recovery of non-carbonized, non-native seeds from prehistoric archaeological contexts is disturbing: plant remains not preserved by burning could not persist archaeologically, and it is probable that the recovered seeds are modern in origin and intrusive into archaeological deposits. Their presence may be explained by a number of factors, foremost by the stratigraphic complexity of the site, where sandy sediments appear to have permitted the leaching and transport of organic materials through soil strata. Rodent activity, aeolian processes or the action of root growth may also explain the introduction of these specimens into archaeological contexts. The presence of European, Asian and Tropical American seed species at PR is similar to the pattern observed at other Delaware sites, including Carey Farm, Leipsic and Pollack.

Although considerable effort and resources were focused on this plant macro-fossil recovery effort, they have yielded a paucity of analytically significant data in regard to vegetative catchment, extent of plant husbandry, and technologies for plant food processing and storage. **SLIDE (table)** Overall, the data conform to the problematic and inconclusive pattern of archeobotanical remains documented regionally. Despite the sites suitability for agriculture, cultivated plant remains are absent, considering the abundant vegetative zones accessible from the site, edible wild plants are under-represented, and non-carbonized, non-native seeds of modern origin have been recovered in abundance from within and below intact cultural features.

SIGNIFICANT CHANGES TO SITE ENVIRONMENT

SLIDE (marsh photo) Close inspection of site environmental conditions is often very instructive in understanding available vegetative resources, and the attraction of the site to human populations. Establishment of Woodland Period human occupations at the confluence of the St. Jones River and Puncheon Run was undoubtedly in response to the desirability of the site: It was naturally defensible, occupying a peninsula surrounded by navigable water; it offered easy travel routes by water - linking site residents with other villages up and down Delaware Bay and its many tributaries. The site offered seasonally abundant wild fare in the form of plants and animals suited to estuarine, floodplain and Coastal-Plain upland environments, and offered a fertile riverine-valley habitat suitable for growing food. But which of these rich environments was most important to the Woodland I and Woodland II residents of PR? The orientation of living surfaces and activity areas confirm that the focus of prehistoric settlements at the site was on aquatic resources.

SLIDE(pr) Significant evidence has come to light which suggests that the present aquatic landscape in the vicinity of the PR site has been considerably altered as a result of historic activities. Since colonial times, The St. Jones River and Puncheon Run have been greatly modified -- sedimentation of these waterways has substantially changed their shape and nature, and effected major alterations in the types of biological resources available within their waters. The Delaware River Valley has historically been an area of immense agricultural value. European settlers in the region found fertile, well-drained alluvial soils well suited to field agriculture, and the area was farmed extensively in small grains, fruits and vegetables through the

20th century.

SLIDE (farm land) The clearing of native forests in the Colonial Period and the ensuing rigorous cultivation of the landscape resulted in the creation of open, unprotected soils which were easily eroded into local streams and rivers. Much of the acclaimed farmland of the Delaware River watershed ended up in its tributaries.

SLIDE (photo pax) By the early 20th century, the St. Jones River was heavily sedimented, and its course had become narrow and sluggish.

Sedimentation of local waterways created an impediment to navigation, and the US Army Corps of Engineers undertook various improvement projects. **SLIDE (map)** The most dramatic of these was the construction of a series of cutoffs between Lebanon and Dover begun in 1908. Three of these cutoffs were executed in the immediate vicinity of the PR Site, **SLIDE (map)** with cutoff #2 actually bisecting the eastern limits of the penninsula on which the site is located, annexing approximately 4 acres of the site as an island. In addition to the forces of tributary siltation and channelization, further changes to aquatic environments were produced by violent storm episodes earlier this century which pushed ocean waters far up Delaware Bay, increasing the salinity of tidal waters in its tributaries.

Of particular interest to our investigation of prehistoric subsistence is the probable role of American lotus or water chinquapin *(Nelumbo lutea)* **SLIDE (lotus photo)** in the diet of the residents of the Puncheon Run Site. *Nelumbo lutea* is a showy marsh plant with edible starchy seeds, shoots and rhizomes, and the species was heavily utilized by Native American peoples

throughout the natural range of the plant. **SLIDE (sassafras)** This recent photograph of Nelumbo growing on the Sassafras River in Maryland in the Ches. Bay watershed clearly shows the clonal nature of the species — it appears to spread like bacteria in a peatrie dish — spreading vigorously from rhizomes and flourishing when conditions are right. Nelumbo is common throughout the Mississippi River drainage system, but on the eastern seaboard, the species is rare, occurring in some few isolated pockets such as this one on the Sassafras. **SLIDE (postcard)** Another such locale was the St. Jones River at Dover, Delaware in the vicinity of the Puncheon Run Site. The St. Jones lotus beds were quite the attraction during the Victorian era when tourists would come in late August from great distances to marvel at the lilies in bloom. These slides are taken from late 19th century postcards celebrating the heyday of lotus-gazing on the St. Jones. **SLIDE (postcard)** River channelization and salt-water infiltration in the 19th and early 20th centuries effectively obliterated the local *Nelumbo* population by so altering the estuarine landscape that the species could no longer thrive. Today only a small, remnant population of Nelumbo persists on the St. Jones. The only reference to the use of *Nelumbo lutea* by the Delaware Indians occurs from 18th century when the group was migrating westward through regions where the plant is common. **SLIDE (lotus nuts)** While no direct ethnographic information has been located which describes the use of *Nelumbo lutea* by Native Americans of the Atlantic coast at the time of European contact, the concomitance of regionally unique lotus beds and human occupation at the PR site is probably more than a coincidence.

There are two possibilities which would explain the co-occurrence of human occupation and this anomalous vegetative feature: 1) Settlement occurred to take advantage of this vegetative anomaly; or more plausibly, 2) that the St. Jones *Nelumbo* was introduced and even propagated

by native peoples as a food plant. However, no archeobotanical evidence has emerged thus far in support of one case on the other.

ASSERTIONS

SLIDE (PRmarsh) We know, based on early ethnographic accounts that at the time of European contact the Lenape or Delaware peoples practiced maize agriculture and lived in modest, semi-sedentary groups on alluvial floodplains and followed a seasonal settlement pattern in response to the availability wild food resources. At the PR site, even though it was physically well-suited for agriculture, archaeologically we find a paucity of cultivated plant remains: and while the site probably offered abundant wild fare we have found insubstantial support for the use of wild plant resources in the archaeological record. We continue to ask -- What were these folks eating?

I'd like to suggest that the PR site was occupied on a seasonal bases expressly for the harvest of fish and the starchy roots of local vegetation - especially marsh plants. These plant resources would have left negligible or unidentifiable durable remains which would explain the lack of paleoethnobotanical data in support of their use.

SLIDE (peltandra tuckaho) There are a number of plants native to the project area which produce fat, potato-like starchy roots which feature prominently in early ethnographic accounts of coastal Algonquian diet. Goldenclub *(Orontium aquaticum),* tuckaho *(Peltandra virginica)*, **SLIDE (Pontederia)** pickerel weed *(Pontederia cordata)*, arrow head *(Sagittaria latifolia)*, american lotus *(Nelumbo lutea)* and cat-tail species *(Typha latifolia, T. angustifolia)* are semi-submerged, aquatic plants native to fresh water tributaries of the St. Jones River. **SLIDE (table)** All of these are perennial species which possess enlarged fleshy roots, rhizomes or tubers which push up new

shoots in shallow, tidal waters in early May, providing an easily identifiable, accessible and plentiful food source.

Additional ethnographically-documented terrestrial plant species common to moist woods and marsh fringes would also have been locally available at PR: ground nut *(Apios americana)*, turks cap lily, bamboo vine and china root, wild yam and wild sweet potato all produce edible, starchy roots which early historical accounts herald as heavily-used foods.

SLIDE (turks cap lily) Residents of PR were well-poised for the collection of these plants. It is plausible that seasonal encampments at the site were aimed at the exploitation of wild roots which were harvested in the late spring and early summer in great quantities and stored in subterranean pits for future use.

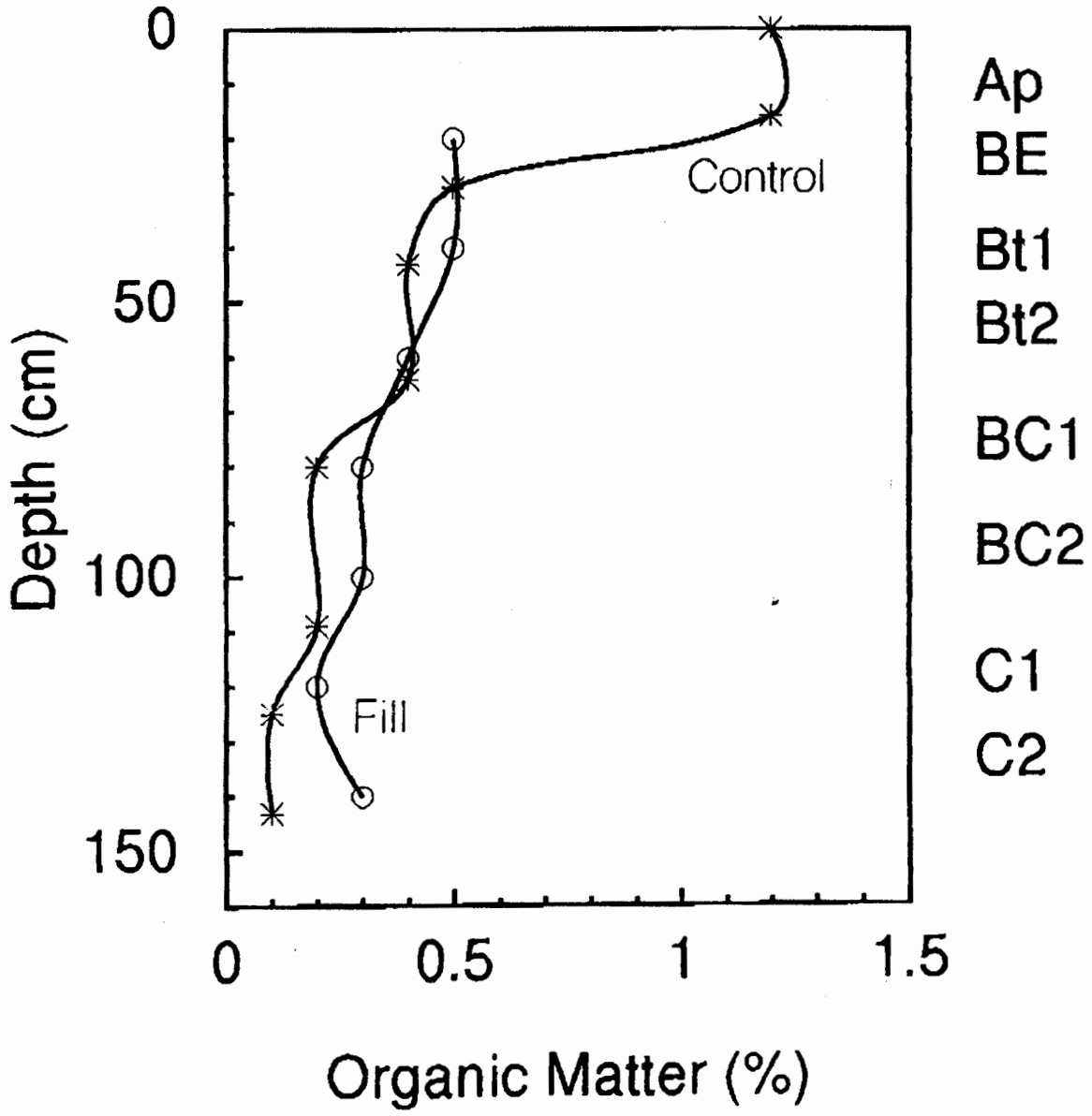
This explanation is certainly speculative, but it does provide a new approach to the lack of understanding regarding plant-derived subsistence on the coastal plain of Delaware, where we have long assumed that the lack of archeobotanical data was simply a result of poor representation -- perhaps this lack of data tells us something else? Namely, that the most economically-important plant resources at some of these seasonally-occupied camps were not preservable at-all archaeologically.

SLIDE (list) This would account for the dearth of macro-floral remains recovered from PR -- as the plant resources which provided dietary mainstays at this stop in the seasonal migration are

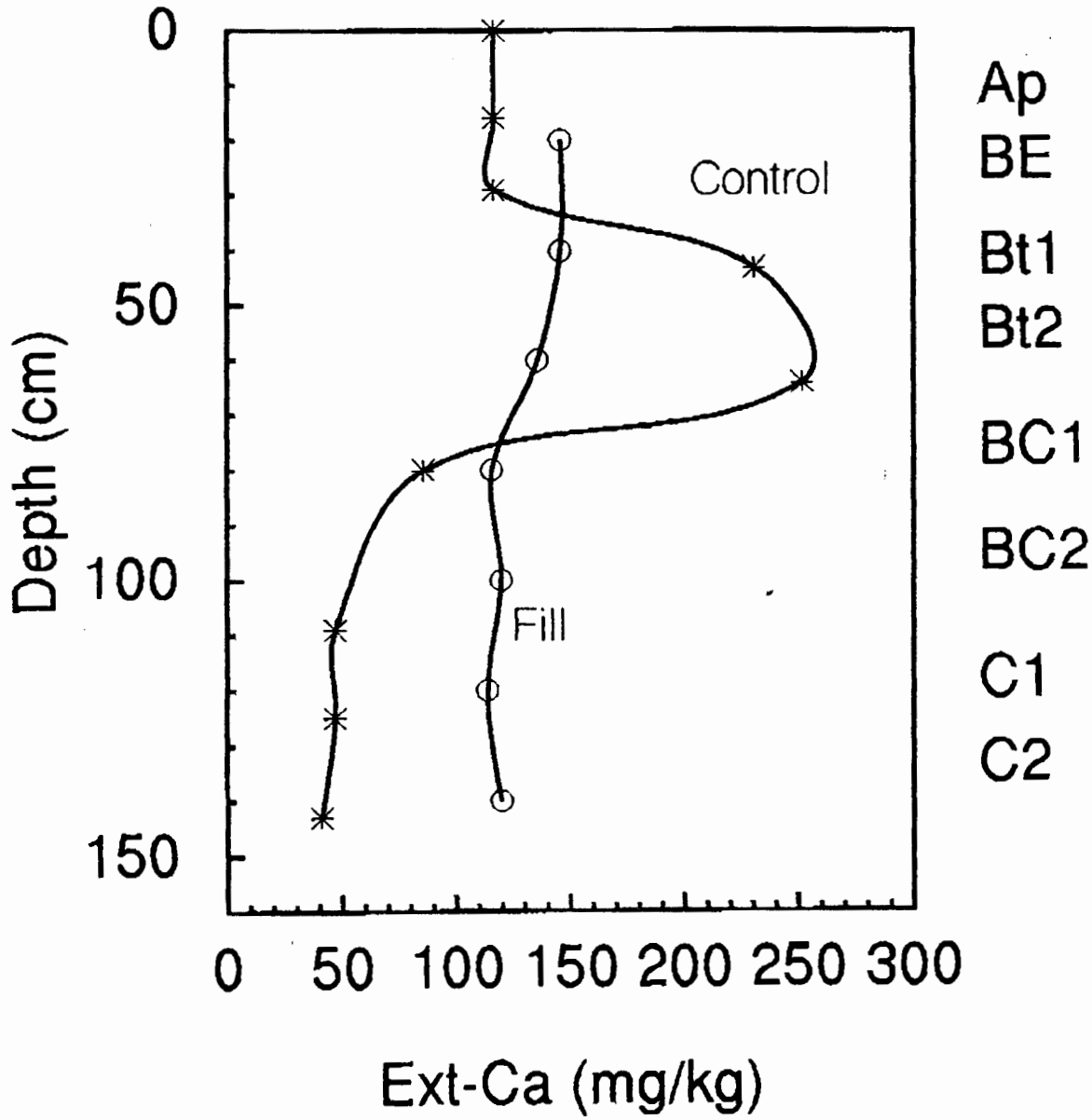
invisible archaeologically. Ethnographic doc describes the mass harvesting, drying, and storing of these roots in subterranean pits - features which have been identified at PR. This explanation also fits nicely with other items of material culture recovered (or not recovered) from the site: The PR tool assemblage, with the exception of a few items in the "metate block" within Locus 3, included no agricultural implements, suggesting that grain production and processing was not an important activity at the site. Also - no artifacts associated with wild plant food processing such as nutting stones were recovered. Based on ethnographic accounts, the harvesting and processing of wild root resources was accomplished using simple tools such as knives of reed or bone, and processing often included pulverization of fresh, dried or reconstituted roots in a wooden mortar: none of these items of material culture would necessarily preserve archaeologically.

This model for plant use employs ethnographic allegory and knowledge of site environment to a thoroughly conducted but unproductive macro-floral assemblage. While it surely does not provide any definitive answers to the question of human-plant relationships at the site, hopefully it provides some incentive for consideration of a wider interpretation of the exploitation and even management of wild plant resources as part of aboriginal subsistence during Woodland times on the Coastal Plain of Delaware.

Organic Matter, Feature 30



Extractable Ca, Feature 30



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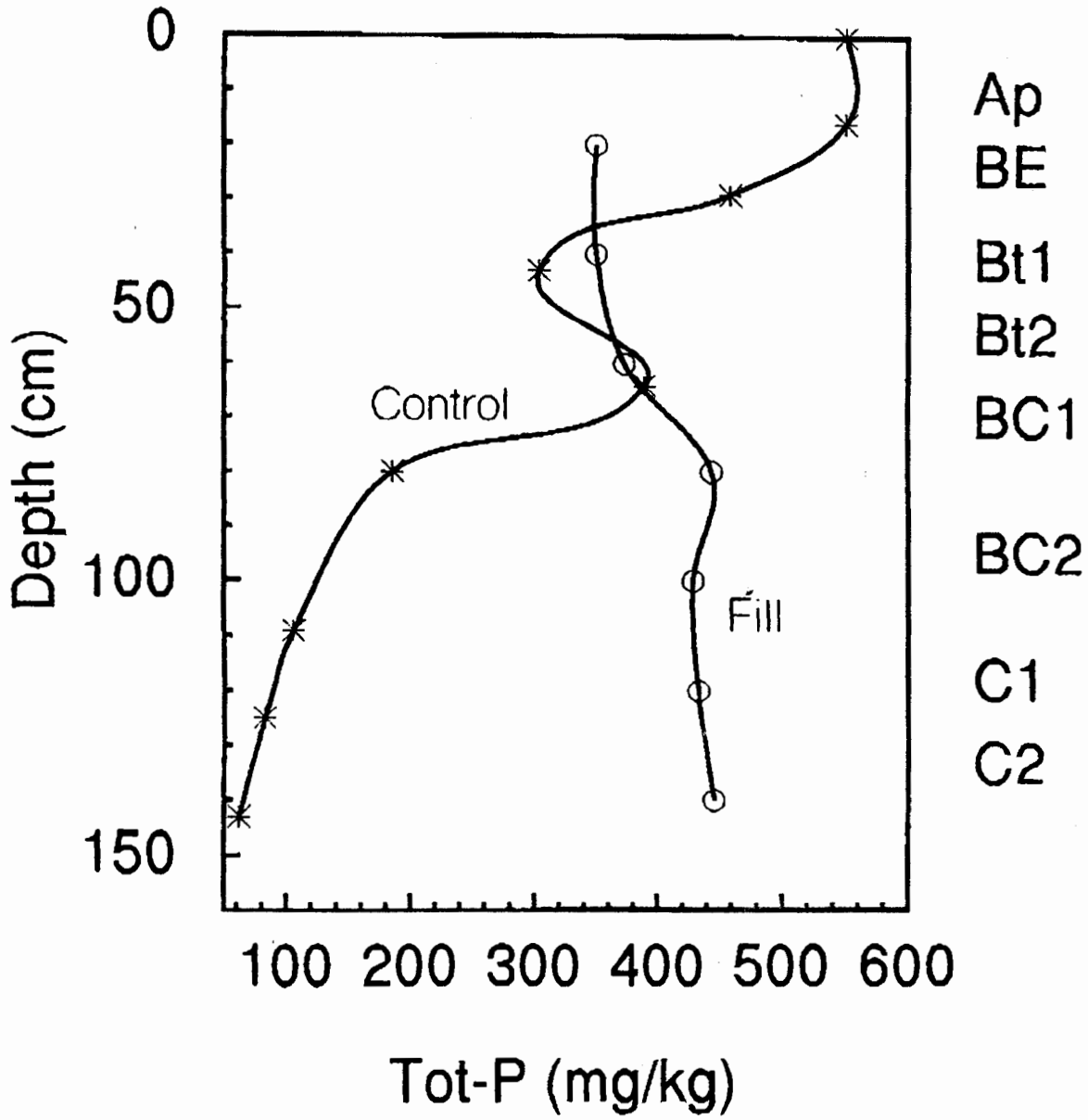

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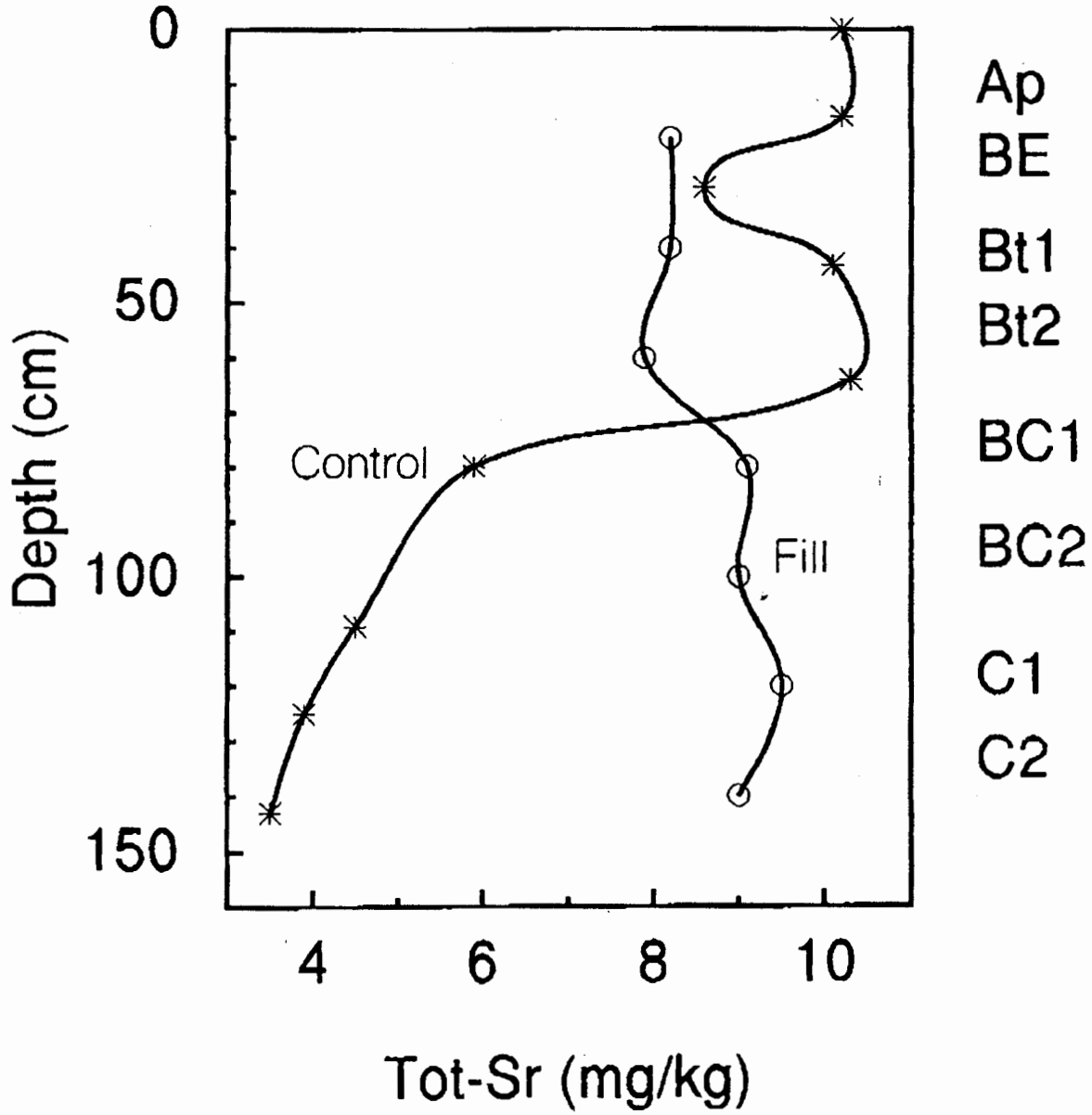

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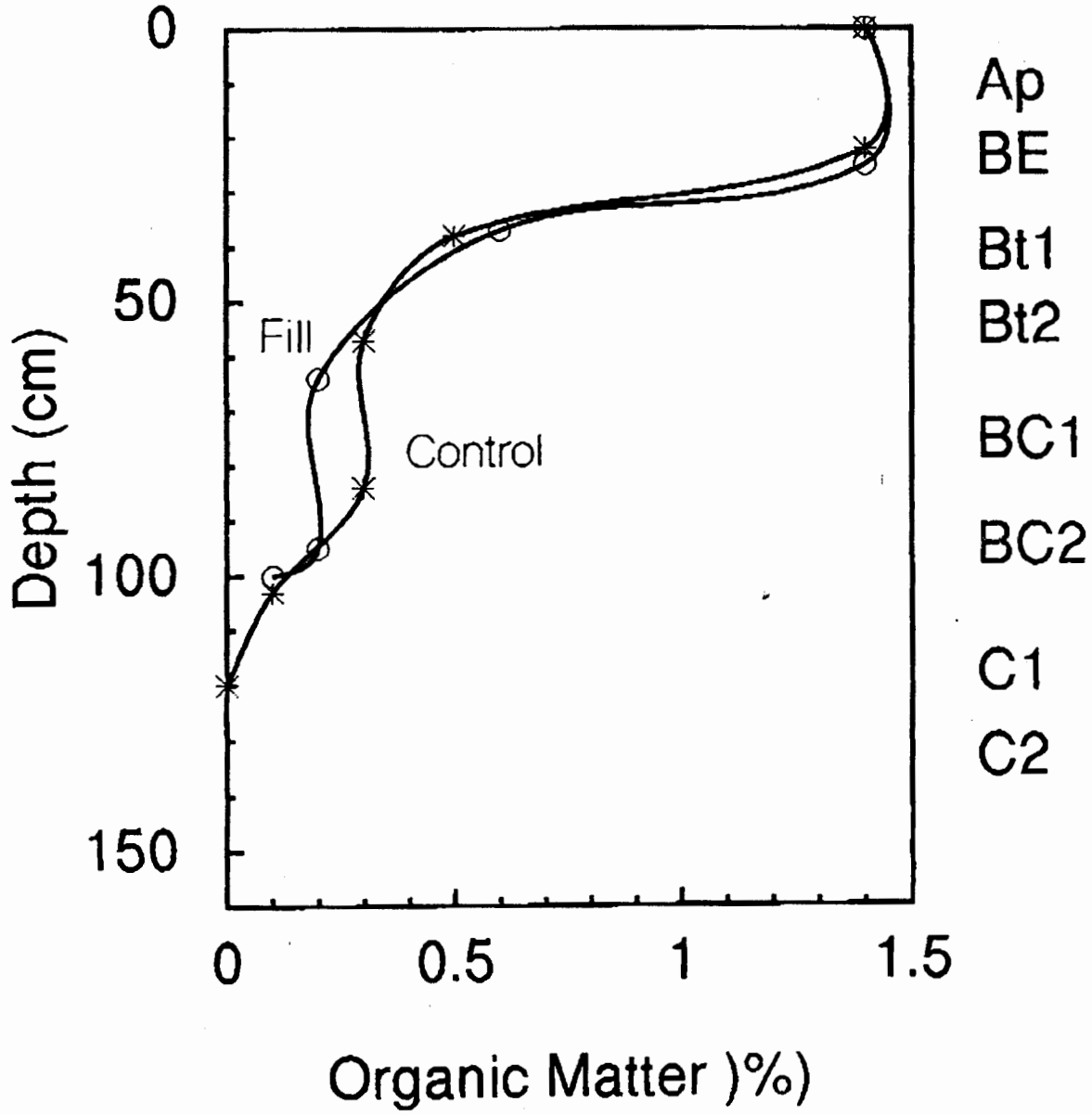

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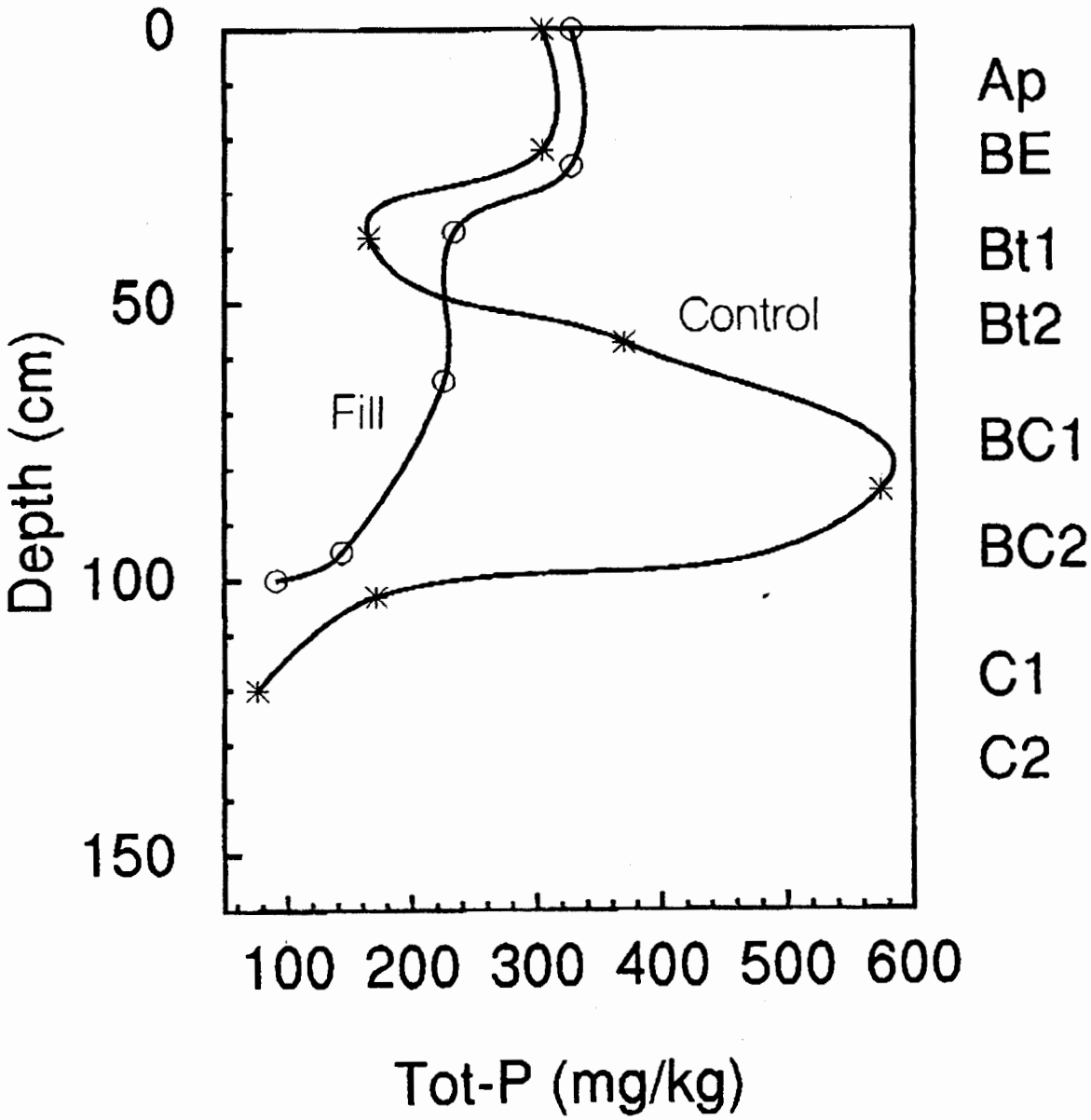

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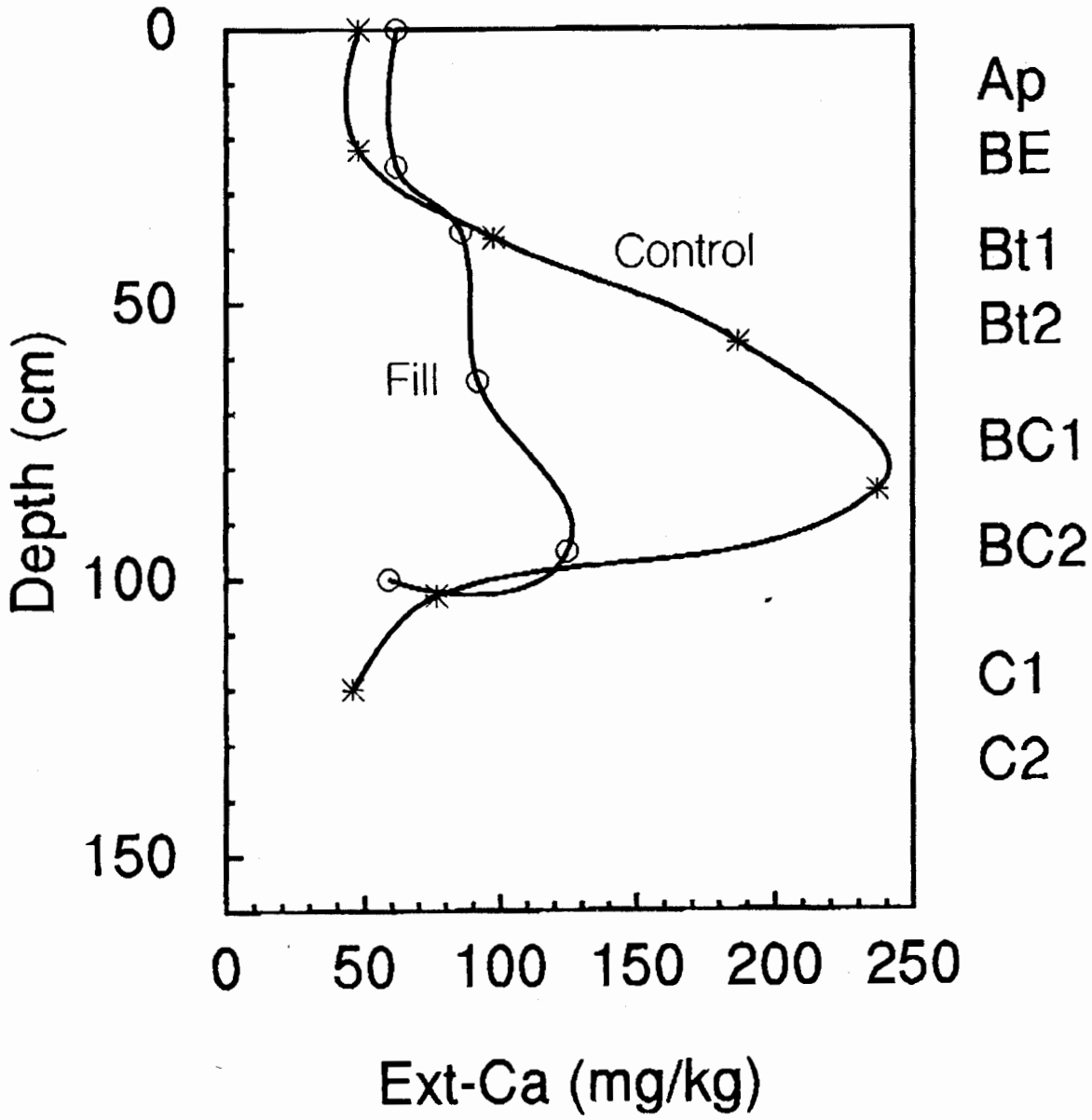

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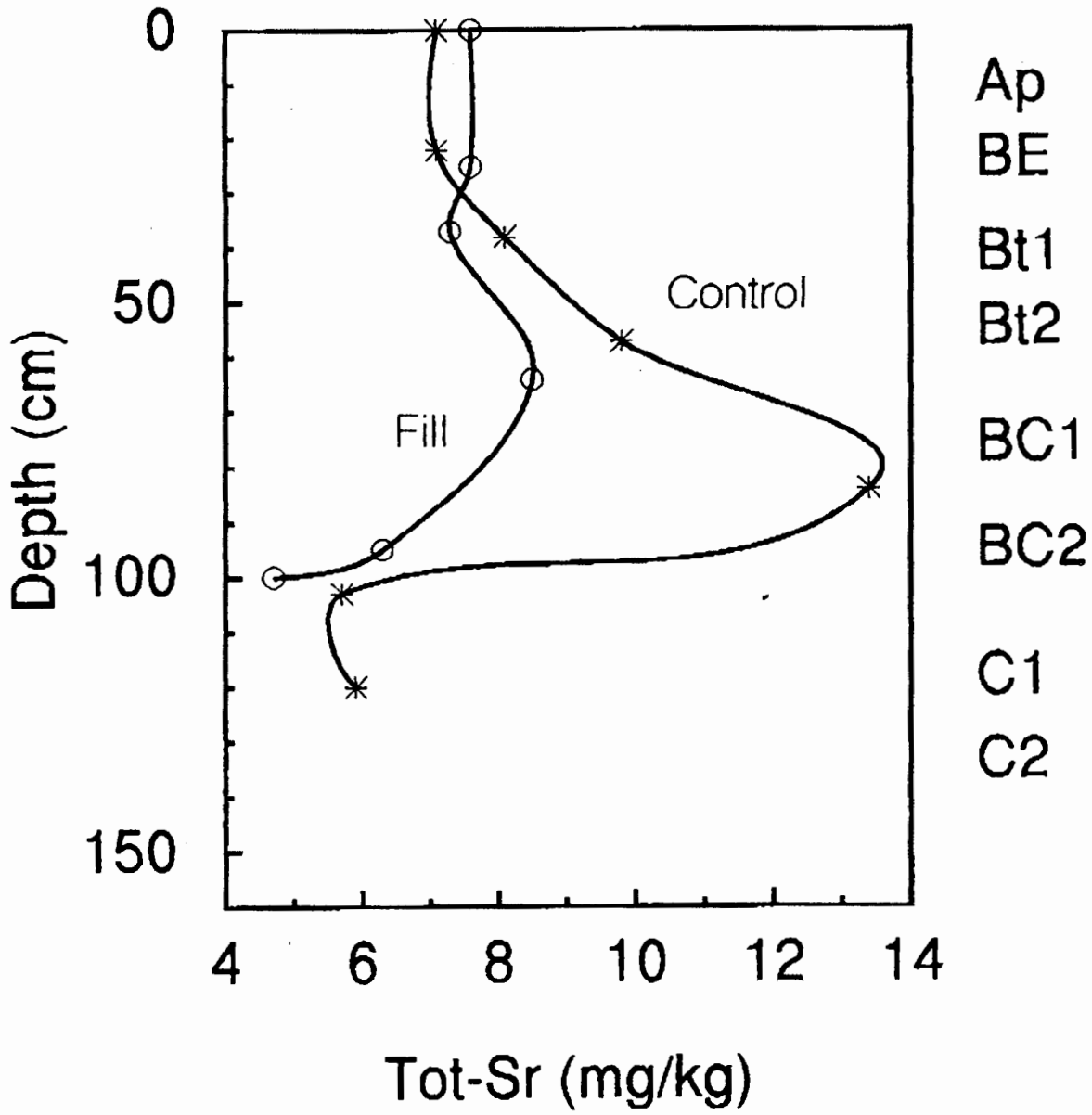
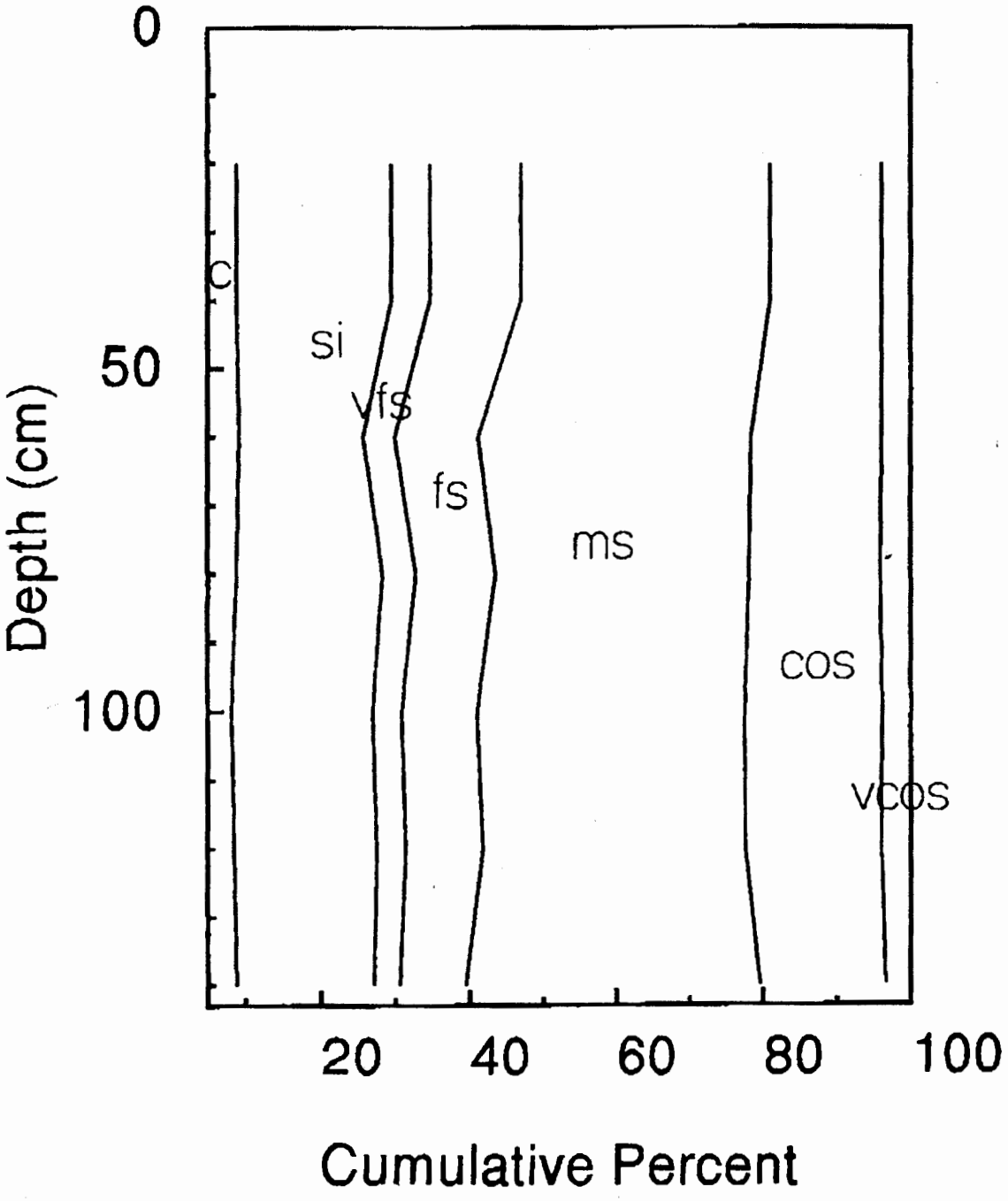


Particle Size, Feature 30-Fill



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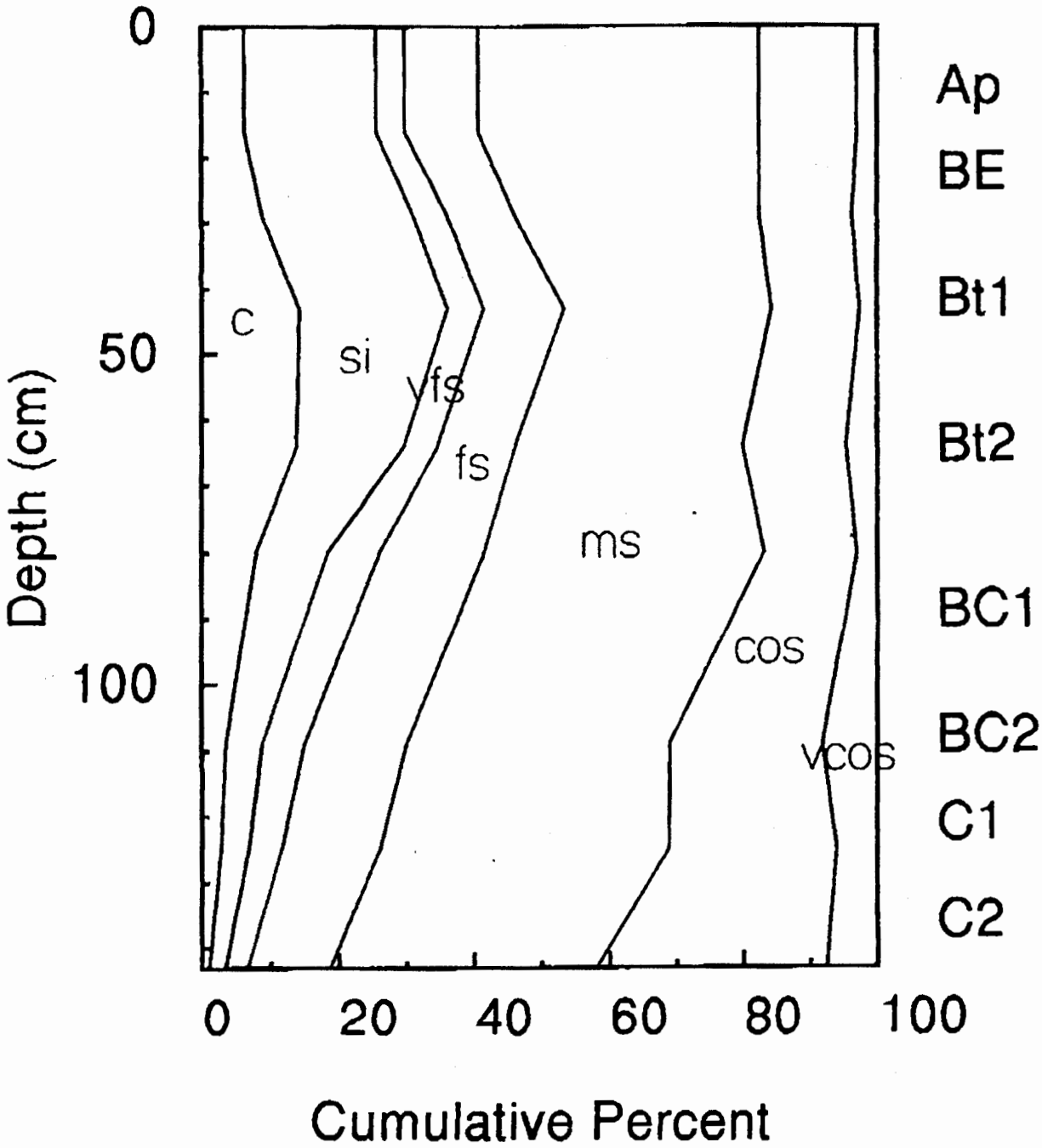

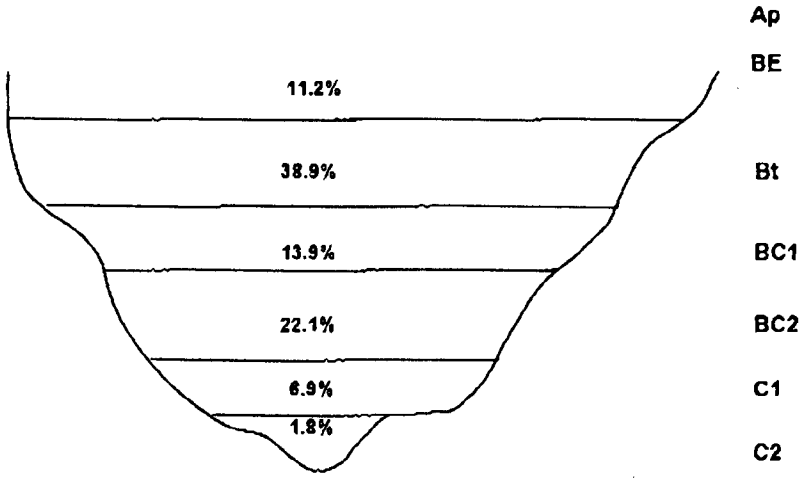
Ap
BE
11.2%
38.9%
Bt
13.9%
BC1
22.1%
BC2
6.9%
C1
1.8%
C2

TEXTURES OF FEATURE 30 AND CONTROL PROFILE

SOIL	% SAND	% SILT	% CLAY
WEIGHTED CONTROL	78.8	12.5	8.7
FEATURE FILL	72.6	18.7	8.7

TEXTURES OF FEATURE 32 AND CONTROL PROFILE

SOIL	% SAND	% SILT	% CLAY
WEIGHTED CONTROL	68.1	20.2	11.7
FEATURE FILL	66.7	25.7	7.6

TEXTURES OF FEATURE 37 AND CONTROL PROFILE

SOIL	% SAND	% SILT	% CLAY
WEIGHTED CONTROL	71.6	13.9	14.5
FEATURE FILL	70.0	19.0	11.0

WEIGHTED TEXTURES OF CONTROL PROFILES

PROFILE	% SAND	% SILT	% CLAY
FEATURE 30 CONTROL	78.6	13.3	8.1
FEATURE 32 CONTROL	74.6	16.5	8.9

CHEMISTRIES OF FEATURE 32 AND CONTROL PROFILE

Soil	pH	Ca	Tot-P	Sr	O.M.
		--------	mg/kg	-------	%
Control	5.0	167	326	9.6	0.37
Feature fill	5.4	89	230	7.9	0.41

CHEMISTRIES OF FEATURE 30 AND CONTROL PROFILE

Soil	pH	Ca	Tot-P	Sr	O.M.
		--------	mg/kg	-------	%
Control	5.5	136	248	7.3	0.31
Feature fill	5.9	125	413	8.8	0.31