

The VegBank taxonomic datamodel

Sponsored by:

The Ecological Society of America - Vegetation Classification Panel

Produced at:

The National Center for Ecological Analysis and Synthesis

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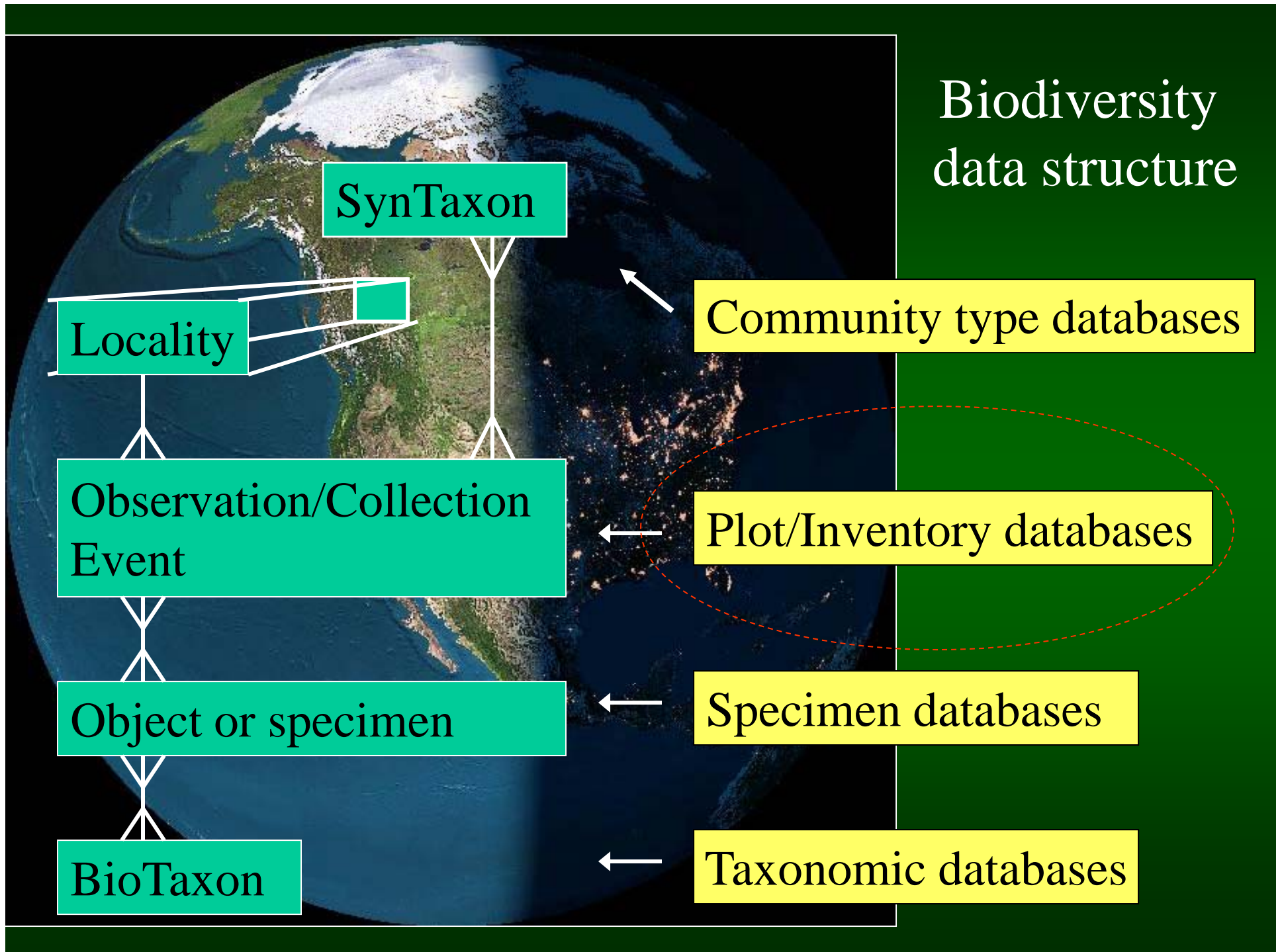
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The Taxonomic database challenge:

Standardizing organisms and communities

The problem:

Integration of data potentially representing different times, places, investigators and taxonomic standards.

The traditional solution:

A standard list of organisms / communities.

Standard lists are available

Representative examples for higher plants include:

* *North America / US*

USDA Plants <http://plants.usda.gov>

ITIS <http://www.itis.usda.gov>

NatureServe <http://www.natureserve.org>

* *World*

IPNI International Plant Names Checklist

<http://www.ipni.org/>

IOPI Global Plant Checklist

<http://www.bgbm.fu-berlin.de/IOPI/GPC/>

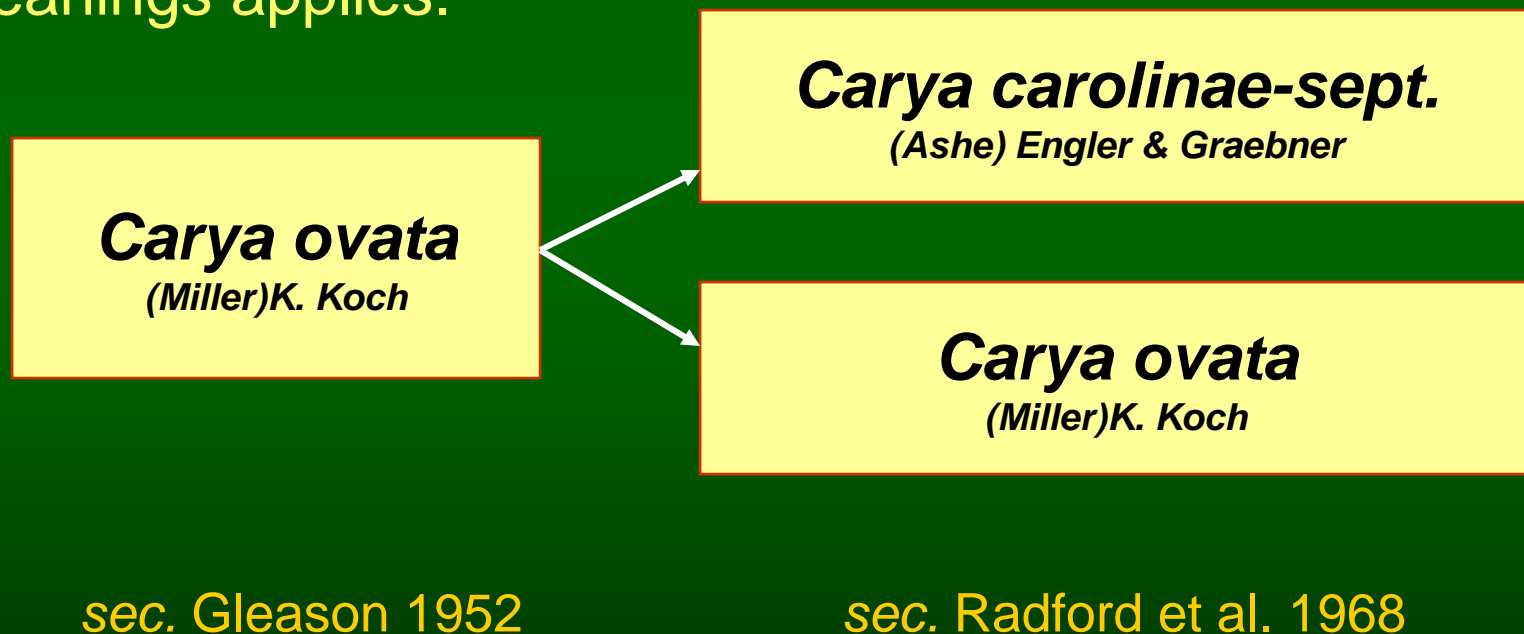
Most standardized taxon lists fail to allow effective integration of datasets

The reasons include:

- The user cannot reconstruct the database as viewed at an arbitrary time in the past,
- Taxonomic concepts are not defined (just lists),
- Multiple party perspectives on taxonomic concepts and names cannot be supported or reconciled.

Three concepts of shagbark hickory

Splitting one species into two illustrates the ambiguity often associated with scientific names. If you encounter the name “*Carya ovata* (Miller) K. Koch” in a database, you cannot be sure which of two meanings applies.



Multiple concepts of *Rhynchospora plumosa* s.l.

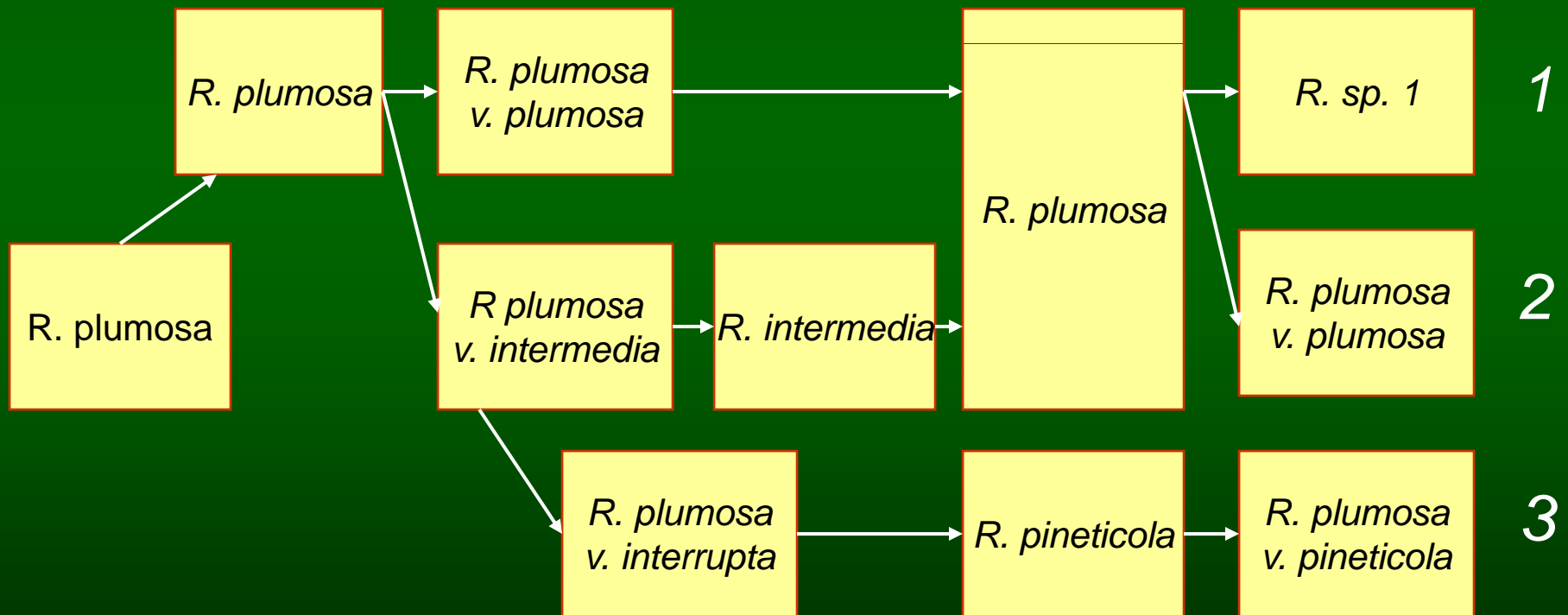
Elliot
1816

Gray
1834

Chapman
1860

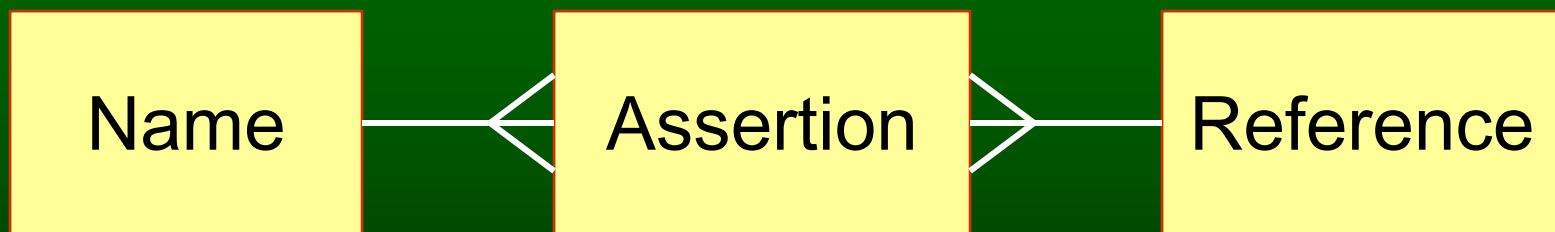
Kral
1998

Peet
2002



An *assertion* represents a unique combination of a *name* and a *reference*

*“Assertion” is equivalent to
“Potential taxon” & “taxonomic concept”*



Six shagbark hickory assertions

Possible taxonomic synonyms are listed together

Names

Carya ovata

Carya carolinae-septentrionalis

Carya ovata v. *ovata*

Carya ovata v. *australis*



Assertions

(One shagbark)

C. ovata sec Gleason '52

C. ovata sec FNA '97

(Southern shagbark)

C. carolinae-s. sec Radford '68

C. ovata v. *australis* sec FNA '97

References

Gleason 1952 Britton & Brown

Radford et al. 1968 Flora Carolinas

Stone 1997 Flora North America



(Northern shagbark)

C. ovata sec Radford '68

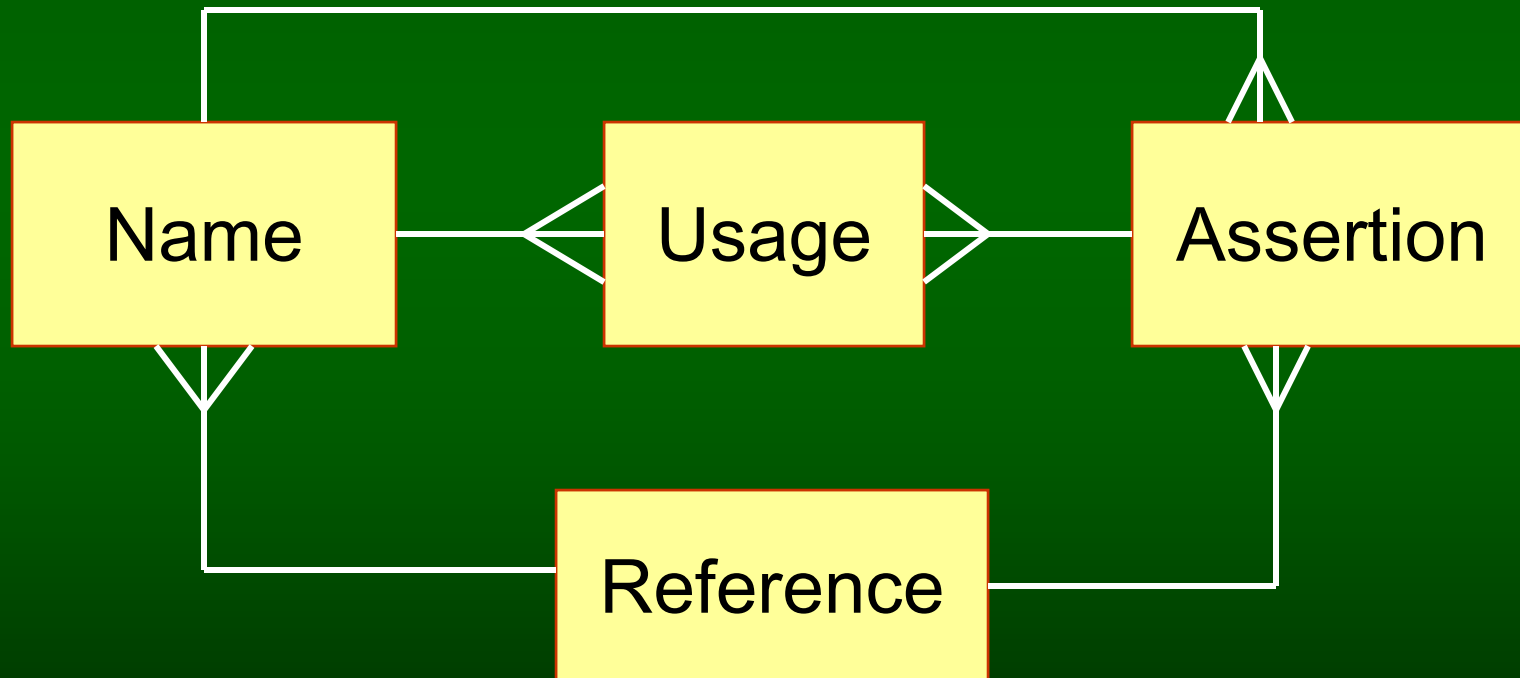
C. ovata (v. *ovata*) sec FNA '97

A *usage* represents a unique combination of an *assertion* and a *name*.

Usages can be used to track nomenclatural synonyms



A *usage* (name assignment) and *assertion* (taxon concept) can be combined in a single model



Names

1. *Carya ovata*
2. *C. carolinae*
3. *C. ovata* var. *ovata*
3. *C. ovata* var. *australis*

ITIS Usage

- 1-F OK
- 2-D OK
- 3-F Syn
- 4-D Syn

Assertions

- A. *ovata* sec. Gleason
- B. *ovata* sec. FNA
- C. *carolinae* sec. Radford
- D. *ovata australis* sec. FNA
- E. *ovata* sec. Radford
- F. *ovata (ovata)* sec. FNA

ITIS likely views the linkage of the assertion “*Carya ovata* var. *australis* sec. FNA 1997” with the name “*Carya ovata* var. *australis*” as a nomenclatural synonym.

Party Perspective

The Party Perspective on an Assertion includes:

- Status – Standard, Nonstandard, Undetermined
- Correlation with other assertions –
Equal, Greater, Lesser, Overlap, Undetermined.
- Lineage – Predecessor and Successor assertions.
- Start & Stop dates.

Application of Party Perspective

Party

ITIS
FNA Committee
NatureServe
USDA Plants

Assertion

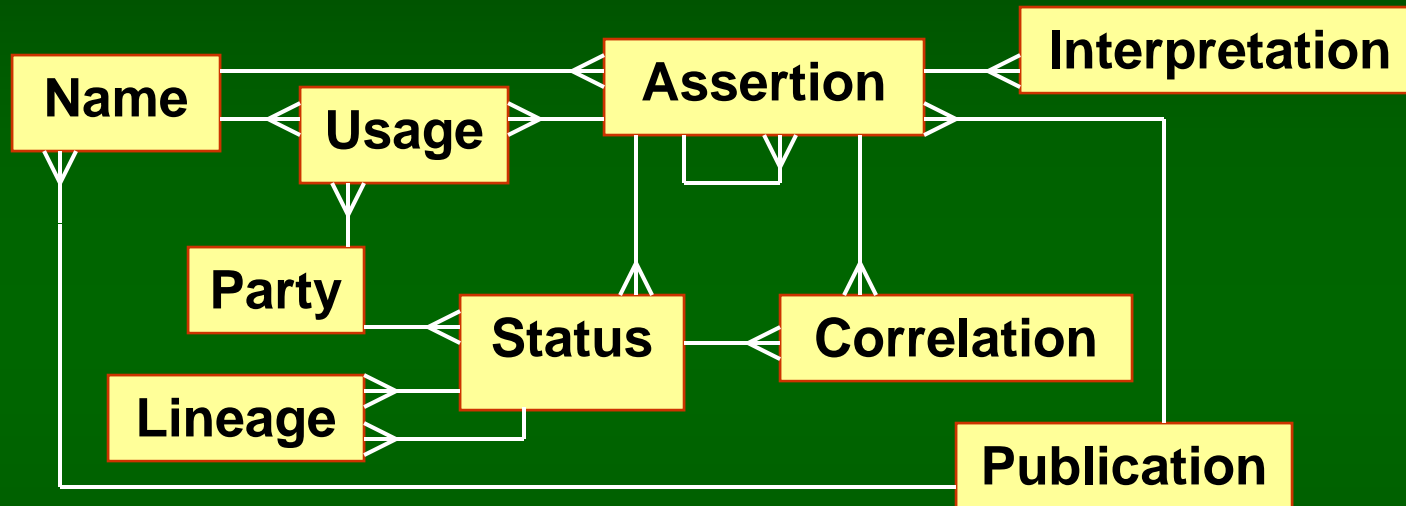
Carya ovata sec Gleason 1952
Carya ovata sec FNA 1997
Carya ovata sec Radford 1968
Carya carolinae sec Radford 1968
Carya ovata (*ovata*) sec FNA 1997
Carya ovata australis sec FNA 1997

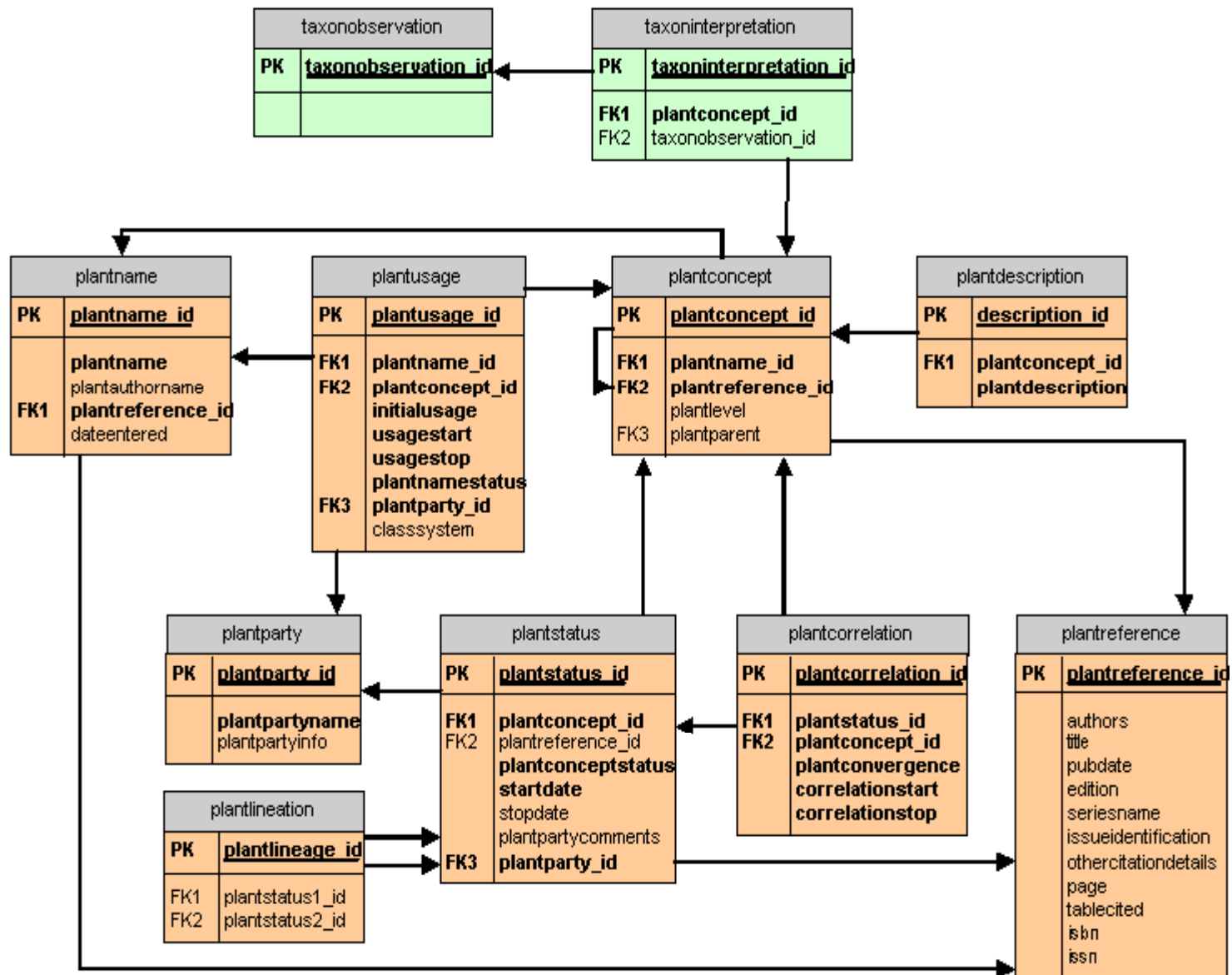
Status

Party	Assertion	Status	Start	Name
ITIS	ovata – G52	NS	1996	
ITIS	ovata – R68	St	1996	C. ovata
ITIS	carolinae – R68	St	1996	C. carolinae-sept.
ITIS	carolinae – R68	NS	2000	
ITIS	ovata aust – FNA	St	2000	C. carolinae-sept.
ITIS	ovata – R68	NS	2000	
ITIS	ovata ovata – FNA	St	2000	C. ovata

Data relationships

VegBank taxonomic data model





(Inter)National Taxonomic Database?

An upgrade for ITIS & Species 2000?

- Concept-based
- Party-neutral
- Perfectly archived
- Synonymy and lineage tracking