

Synonymy and Terminological Variation in Selection and Seed Production Terminology: A Comparative Analysis of German, English, Russian, And Uzbek

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Abstract: This article examines the problem of synonymy and terminological variation in the multilingual terminology of selection and seed production across German, English, Russian, and Uzbek. The study is grounded in an author-developed multilingual glossary corpus, which serves as the primary empirical basis for identifying synonymic rows, lexical doublets, and functionally differentiated terminological variants. The relevance of the research lies in the growing need for terminological precision in agricultural linguistics, multilingual knowledge transfer, and seed certification discourse, where uncontrolled lexical variation may lead to conceptual ambiguity and translation inconsistency.

The study integrates theoretical principles from terminology studies, cognitive semantics, and multilingual lexicography to investigate how terminological variants encode different conceptual layers of agronomic knowledge. The analysis reveals that synonymic relations in the field are not instances of accidental lexical duplication but rather represent a conceptually motivated mechanism of scientific knowledge structuring. Based on the glossary evidence, four major models of synonymic relations are identified: frame-dependent partial synonymy, perspective-based synonymy, international-native doublets, and hierarchical taxonomic synonymy. These models are illustrated through multilingual terminological pairs related to seed material, hybrid breeding, pollination, and varietal purity.

A major contribution of the article is the development of a three-tier standardization model that distinguishes between preferred dominant terms, admitted functional variants, and restricted peripheral doublets. This model provides practical criteria for multilingual glossary compilation, agricultural translation, terminology teaching, and the standardization of seed certification documents. The findings demonstrate that controlled synonymy can serve as a knowledge-structuring and interoperability-enhancing mechanism, preserving conceptual precision while accommodating discourse-specific variation.

The article contributes to the broader field of multilingual terminology management by proposing a corpus-based framework for regulating synonymy in specialized agricultural discourse. The proposed approach is particularly relevant for digital terminology databases, AI-assisted lexicography, and international scientific communication in the rapidly expanding domain of agricultural genetics and seed technology.

Keywords: Terminology, synonymy, terminological variation, multilingual glossary, seed production, standardization.

Introduction: In modern terminology studies, the issue of synonymy and variation in specialized vocabulary remains one of the most debated problems, particularly in rapidly developing scientific domains. Although the classical theory of terminology

traditionally promoted the principle of one concept – one term, recent research has shown that real terminological systems often demonstrate lexical duplication, doublets, structural variants, and parallel designations for the same concept (Cabr , 2003;

Temmerman, 2000). This phenomenon often leads to ambiguity in scientific communication and creates challenges for terminological standardization, multilingual interoperability, and knowledge transfer (ISO, 2009; Wright, 2022).

Selection and seed production terminology is especially prone to such variation because the field combines biological, agronomic, genetic, and technological knowledge systems. As a result, the same concept may be represented by several competing forms within and across languages. For example, the multilingual glossary compiled for the present study demonstrates parallel designations such as hybrid seed / crossbred seed, Saatgut / Samenmaterial, семенной материал / семена, and urug'lik / urug' materiali (Khamidov, Mirmukhsin & Khamidova, Tilovatkhon. 2011). Such synonymic rows constitute an important theoretical and practical issue for terminological normativity, translation accuracy, and multilingual glossary design (Bowker & Pearson, 2002; Kerremans et al., 2004).

Recent studies in terminology standardization confirm that uncontrolled lexical variation negatively affects scientific precision, interoperability, multilingual communication, and lexicographic consistency (ISO, 2009; Wright, 2022). Particularly in multilingual domain resources, synonymic duplication may lead to conceptual overlap, partial equivalence, or even the misinterpretation of specialized knowledge, which in turn complicates dictionary compilation and terminology database management (Sager, 1990; Zgusta, 2006).

The relevance of the present study lies in the fact that selection and seed production terminology in German, English, Russian, and Uzbek has not yet been systematically investigated from the perspective of synonymic clustering and terminological variation using an author-developed multilingual glossary as the primary corpus. This research gap is especially significant for agricultural linguistics, where terminological precision directly influences scientific communication, translation, and knowledge transfer (Faber & L'Homme, 2022).

The object of the study is the synonymic and variable layer of selection and seed production terminology in German, English, Russian, and Uzbek. The subject of the study is the lexical, structural, and functional mechanisms through which multiple terms are used to denote a single scientific concept (Khamidov, Mirmukhsin 2021).

The study aims to identify the main types of synonymy and variation in multilingual agricultural terminology and to propose criteria for selecting dominant standardized forms. To achieve this aim, the following

objectives are set:

- to examine the theoretical foundations of terminological synonymy and variation;
- to identify synonymic rows and doublets from the multilingual glossary corpus;
- to classify lexical, structural, and translation-based variants;
- to determine dominant and peripheral forms for standardization purposes.

The scientific novelty of the article lies in the fact that synonymic clusters in selection and seed production terminology are analyzed for the first time on the basis of an author-generated multilingual glossary corpus, with special attention to cross-linguistic equivalence and standardization mechanisms.

Theoretical foundations of terminological synonymy and variation. In contemporary terminology studies, synonymy is no longer regarded as a purely undesirable phenomenon. While classical terminology theory advocated the principle of one concept – one term, modern descriptive and sociocognitive approaches demonstrate that synonymy and variation are natural features of specialized communication (Cabr , 2003; Temmerman, 2000).

This shift is especially relevant for highly dynamic scientific domains such as selection and seed production, where terminological systems constantly evolve.

From the perspective of the Communicative Theory of Terminology, synonymy emerges as a functional response to different communicative contexts, user groups, and discourse purposes. In this sense, two or more terms may designate the same concept without necessarily creating conceptual conflict (Cabr , 2003).

For example, in agricultural discourse, forms such as hybrid seed and crossbred seed may coexist as conceptually equivalent designations while differing in usage frequency, disciplinary preference, or translation tradition.

A distinction should be made between terminological synonymy and terminological variation. Synonymy usually refers to two or more designations representing the same scientific concept, whereas variation includes a broader range of phenomena such as orthographic, structural, contextual, shortened, and translation-induced variants (L'Homme, 2020).

Thus, variation can be viewed as an umbrella category within which synonymic relations constitute one important subtype.

Another important notion is the concept of terminological doublets. Doublets arise when parallel

lexical units compete for dominance within the same domain. Such competition is often caused by:

- international vs native forms
- full term vs shortened form
- scientific vs practice-oriented denomination
- source-language vs translated variant

This phenomenon is particularly common in multilingual agricultural terminology, where English-led international forms interact with German, Russian, and Uzbek equivalents.

Modern sociocognitive terminology further argues that controlled synonymy may even enhance knowledge representation because different variants can foreground different conceptual perspectives (Temmerman, 2000).

For instance, one variant may highlight the biological nature of a concept, while another emphasizes its technological function. In your multilingual glossary, such distinctions are expected to be especially visible in seed classification and breeding methodology terms.

A central issue closely connected with synonymy is terminological standardization. Uncontrolled variation may negatively affect scientific precision, translation consistency, lexicographic description, and multilingual interoperability. Recent research confirms that terminology resources increasingly employ graded synonym ranking, where one term is selected as dominant and others are marked as admitted variants.

This principle is highly relevant for your study because the multilingual glossary corpus allows the identification of core terms, peripheral variants, and translation-based doublets.

Therefore, the theoretical basis of the present study rests on the assumption that synonymy in specialized agricultural terminology should not simply be eliminated, but rather systematically classified, functionally interpreted, and standardized according to corpus evidence. The author-developed multilingual glossary offers a reliable empirical basis for tracing such synonymic clusters across German, English, Russian, and Uzbek.

Glossary-based analysis of synonymic relations in selection and seed production terminology. The multilingual glossary corpus reveals that synonymy in selection and seed production terminology should not be interpreted as mere lexical duplication. Rather, it reflects conceptual stratification within the knowledge structure of the domain, where competing designations encode distinct epistemic perspectives on the same agronomic concept.

From a linguistic point of view, the identified synonymic

relations fall into at least four analytically relevant types: absolute, partial, hierarchical, and perspective-based synonymy. The coexistence of such variants is conditioned by disciplinary granularity, translation history, and the interaction between international scientific nomenclature and nationally adapted terminological systems.

Absolute and near-absolute synonymy in seed material terminology

A central synonymic row in the glossary concerns the designation of sowing units and breeding resources:

- German: Saatgut / Samenmaterial
- English: seed / seed material
- Russian: семена / семенной материал
- Uzbek: urug'lik / urug' materiali

At first glance, these pairs appear lexically synonymous. However, a closer linguistic-semantic analysis demonstrates that they represent near-absolute rather than full synonymy.

The terms Saatgut, seed, семена, and urug'lik show strong collocational preference in certification, sowing technology, and seed quality assessment discourse, where the focus lies on the material as an agronomic input unit.

By contrast, Samenmaterial, seed material, семенной материал, and urug' materiali activate a broader conceptual frame associated with genetic resources, parental lines, laboratory samples, and breeding stocks.

Thus, the synonymic relation is better described as frame-dependent partial synonymy, where lexical equivalence shifts according to the conceptual layer activated in discourse.

Perspective-based synonymy in hybrid breeding terminology

The glossary further demonstrates that hybrid breeding terminology is characterized by perspectivized synonymy, where different terms profile different stages of the same breeding event.

- English: hybrid seed / crossbred seed
- German: Hybridsaatgut / Kreuzungssaatgut
- Russian: гибридные семена / скрещённые семена
- Uzbek: gibrid urug'lar / chatishma urug'lar

From a cognitive-semantic standpoint, the lexical opposition here reflects result profiling vs process profiling.

- hybrid / gibrid / гибрид foregrounds the stable genetic product
- crossbred / Kreuzung / chatishma foregrounds the

operation of crossing

This distinction is highly significant in selection discourse. In breeding reports and genetic passporting, the result-oriented variant functions as the dominant term. In contrast, process-oriented variants are more frequent in pedagogical, extension, and methodological texts.

Therefore, this row exemplifies conceptual perspective synonymy, not simple lexical duplication.

International-native doublets in pollination terminology

A particularly rich type of variation in the glossary is represented by reproductive terminology:

- German: Selbstbestäubung / Autogamie
- English: self-pollination / autogamy
- Russian: самоопыление / автогамия
- Uzbek: o'z-o'zidan changlanish / avtogamiya

Here, the synonymic structure reflects the coexistence of transparent descriptive native terms and international Greco-Latin scientific doublets.

Linguistically, this contrast illustrates the tension between:

1. semantic transparency
2. terminological precision
3. international interoperability

The native forms are semantically decomposable and therefore highly accessible in agronomic training materials. The international forms, however, are conceptually compressed and better integrated into cross-disciplinary genetics discourse.

This type may be classified as register-conditioned doublet synonymy.

2.4. Hierarchical synonymy in varietal purity terminology

The glossary also reveals hierarchical relations disguised as synonymy:

- English: varietal purity / genetic purity
- German: Sortenreinheit / genetische Reinheit
- Russian: сортовая чистота / генетическая чистота
- Uzbek: nav tozaligi / genetik tozalik

Although these forms are often treated as equivalents in practical discourse, the underlying conceptual hierarchy is more nuanced.

- varietal purity refers to phenotype-level conformity
- genetic purity refers to molecular-genetic stability

From a terminological theory perspective, this relation is not full synonymy but taxonomic proximity, where

one term may function as a superordinate or subordinate specification depending on certification context.

This is especially relevant in hybrid seed control systems, where molecular markers are increasingly used.

The glossary-based evidence confirms that synonymy in agricultural terminology is conceptually motivated and cognitively structured. The main models identified are:

1. frame-dependent partial synonymy
2. perspective-based synonymy
3. international-native doublets
4. hierarchical taxonomic synonymy

Consequently, synonymic variation in selection and seed production terminology should be treated as a knowledge-structuring mechanism, rather than as a deviation from terminological normativity.

This finding is particularly important for multilingual glossary standardization, where dominant forms should be selected not merely by frequency, but by conceptual precision, discourse domain, and interoperability value.

Models of terminological variation and standardization criteria. The glossary-based findings discussed in the previous section demonstrate that synonymic relations in selection and seed production terminology are systematic rather than accidental. Therefore, the next analytical step is to establish criteria for selecting dominant terms and regulating admitted variants within a multilingual terminological system.

From the perspective of applied terminology, standardization should not aim at eliminating all variants. Instead, it should define a hierarchically organized model of preferred, secondary, and context-bound forms, ensuring conceptual clarity while preserving disciplinary nuance.

In the present study, the multilingual glossary corpus allows the formulation of a three-tier standardization model for agricultural terminology.

Dominant term selection: conceptual precision criterion

The primary criterion for selecting a dominant term is conceptual precision.

A dominant term must:

- activate the most stable conceptual frame;
- avoid ambiguity across breeding stages;
- align with international scientific nomenclature;
- remain interoperable in multilingual translation.

For example, within the row:

- hybrid seed / crossbred seed
- gibrud urug' / chatishma urug'

the term hybrid seed / gibrud urug' should be considered dominant because it directly profiles the genetic product as a stable breeding outcome, which is the key object in seed certification, genetic passporting, and hybrid commercialization.

By contrast, crossbred seed remains process-oriented and therefore contextually secondary.

This criterion may be termed conceptual centrality ranking.

Admitted variants: discourse-functional criterion

Not all non-dominant terms should be excluded. Many variants perform important register-specific and pedagogical functions.

For instance:

- self-pollination / autogamy
- o'z-o'zidan changlanish / avtogamiya

The international variant autogamy offers higher precision in reproductive genetics, while the descriptive native equivalent is more transparent in extension manuals, university textbooks, and farmer-oriented guidelines.

Therefore, such forms should be treated as admitted functional variants, whose use depends on:

- target audience
- discourse genre
- translation direction
- educational level

This principle ensures register-sensitive standardization rather than rigid lexical reduction.

Peripheral doublets and restricted variants

The glossary also contains forms that should be classified as peripheral doublets.

These include:

- outdated translation calques
- structurally redundant combinations
- overly broad resource terms
- context-limited explanatory paraphrases

For example:

- seed material in general agronomic sowing contexts
- urug' materiali in field certification protocols

In such cases, the broader variant lacks the procedural specificity required by the discourse and should be restricted to breeding-resource documentation.

This classification helps prevent domain drift, where concept boundaries become blurred due to uncontrolled lexical expansion.

A multilingual standardization model for glossary development

Based on the analysis, the following model may be proposed for multilingual agricultural glossary design:

Standardization hierarchy

1. Preferred dominant term the conceptually central, internationally aligned form
2. Admitted variant(s) pedagogically, register-wise, or translation-wise justified alternatives
3. Restricted peripheral doublet context-bound or non-recommended form

This hierarchy is especially useful for multilingual resources covering German, English, Russian, and Uzbek, because it preserves:

- semantic precision
- translation consistency
- domain interoperability
- lexicographic usability

From a linguistic standpoint, the model integrates terminological theory, frame semantics, and corpus-based multilingual lexicography.

The proposed standardization criteria demonstrate that terminological variation in selection and seed production should be regulated through conceptual hierarchy rather than mechanical synonym elimination.

The multilingual glossary evidence suggests that the most reliable criteria are:

1. conceptual precision
2. frame stability
3. discourse functionality
4. international interoperability
5. pedagogical transparency

Such a model is particularly relevant for:

- multilingual dictionary compilation
- agricultural translation
- seed certification documents
- breeding methodology manuals
- academic terminology teaching

Thus, the study contributes not only to theoretical terminology, but also to the practical standardization of agricultural knowledge systems.

CONCLUSION

The present study has demonstrated that synonymy

and variation in selection and seed production terminology across German, English, Russian, and Uzbek should be interpreted as a systematic and conceptually motivated phenomenon rather than accidental lexical duplication. The analysis based on the author-developed multilingual glossary corpus confirms that terminological variants reflect the internal stratification of agronomic knowledge, where different lexical forms profile distinct conceptual, functional, and discourse-related aspects of the same scientific concept.

From a theoretical perspective, the study has identified four major models of synonymic relations in multilingual agricultural terminology: frame-dependent partial synonymy, perspective-based synonymy, international-native doublets, and hierarchical taxonomic synonymy. These models reveal that synonymy in specialized discourse is closely linked to cognitive framing, disciplinary granularity, and the interaction between global scientific nomenclature and nationally adapted lexical systems.

A key methodological contribution of the article lies in the use of an author-generated multilingual glossary as the primary empirical corpus, which made it possible to trace synonymic clusters not only across languages, but also across conceptual layers of breeding and seed technology discourse. This corpus-based approach has shown that terminological equivalence cannot be determined solely on lexical similarity; instead, it must be evaluated through conceptual scope, frame activation, and discourse functionality.

The proposed three-tier standardization model—preferred dominant term, admitted functional variant, and restricted peripheral doublet—constitutes the principal applied outcome of the research. This model provides practical criteria for multilingual glossary design, agricultural translation, terminology teaching, and the standardization of seed certification documentation. In particular, the criteria of conceptual precision, international interoperability, pedagogical transparency, and register-sensitive usage are shown to be decisive for selecting dominant forms.

The study also contributes to the broader field of multilingual terminology management by demonstrating that controlled synonymy can serve as a knowledge-structuring mechanism. Rather than eliminating all lexical variation, effective terminological policy should preserve functionally motivated variants while regulating their domain of use.

The findings are especially relevant for the development of specialized multilingual dictionaries, digital terminology databases, translation systems, and academic resources in agricultural linguistics. Given the

rapid expansion of genetic breeding technologies and international seed trade, terminological consistency across languages is becoming increasingly important for scientific communication and regulatory harmonization.

Future research may expand this model by incorporating corpus frequency analysis, expert surveys among breeders and seed technologists, and AI-assisted terminology extraction from agricultural research articles. Such directions would further strengthen the interface between theoretical terminology, computational linguistics, and domain-specific lexicography.

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