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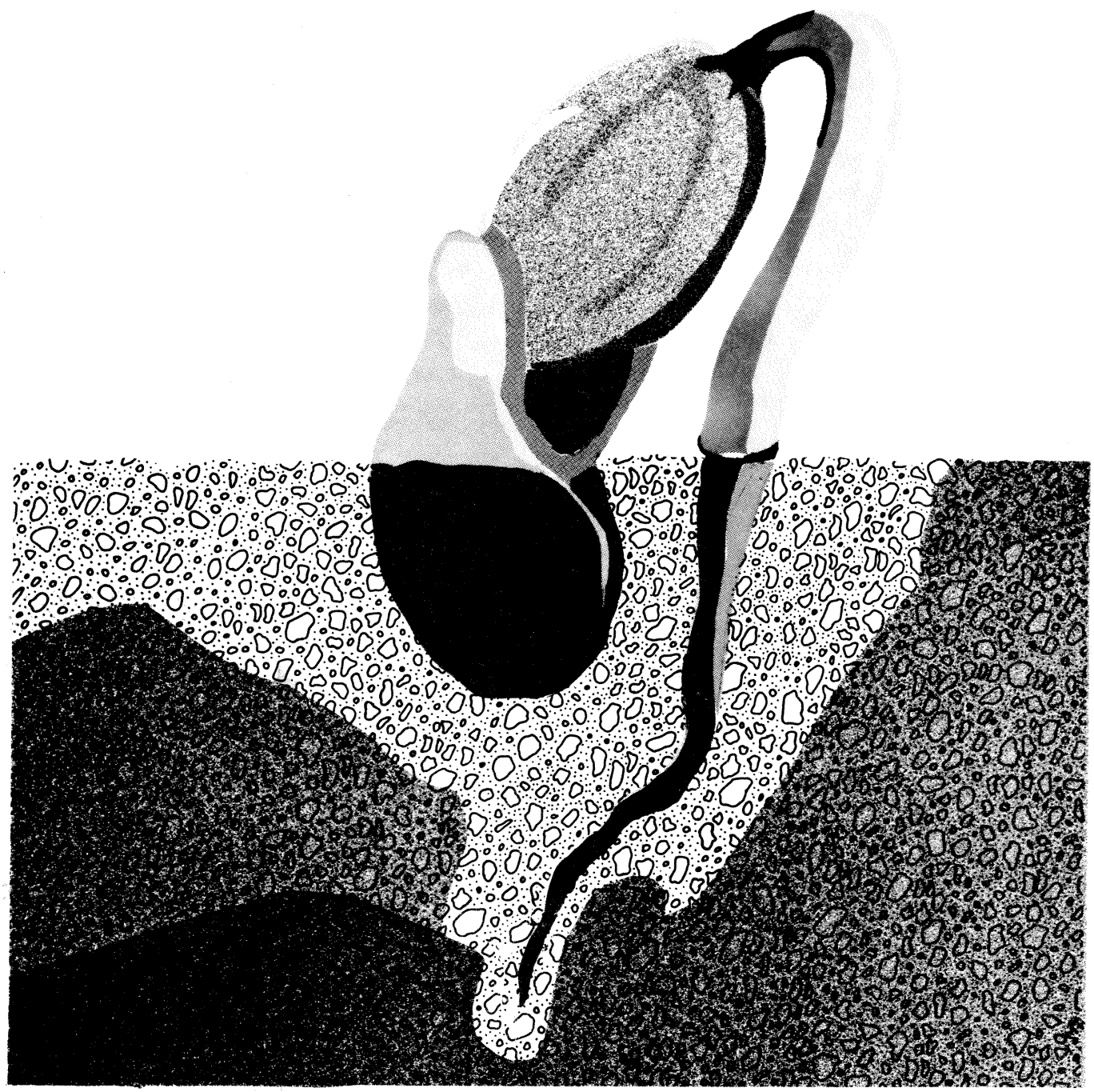
Glossary of Seed Germination Terms for Tree Seed Workers

F. T. Bonner



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FOREWARD

This glossary is designed for scientists and technicians who are concerned with testing or research with forest tree seeds. Its sole purpose is to improve communications between tree seed workers, especially where language differences may be confusing. For this reason, the definitions have been simplified as much as possible without sacrificing their technical meaning.

This glossary is a project of IUFRO WORKING PARTY S2.01.06 "Seed Problems." The following references were used in its preparation:

Ford-Robertson, F. C. (ed.) 1971. Terminology of forest science, technology practice and products. English-language version. Multiling. For. Term Ser. No. 1, Soc. Amer. Foresters, Washington, DC. 349 p.

Gray, P. 1967. The dictionary of the biological sciences. Reinhold Publ. Corp., New York. 602 p.

International Seed Testing Association. 1976. International rules for seed testing: rules 1975. Seed Sci. and Technol. 4: 3-177.

USDA, Forest Service. 1974. Seeds of woody plants in the United States. USDA Agri. Handb. No. 450. 883 p.

When references differed, preference was given to those definitions conforming to current usage as determined by the majority of the authorities who reviewed this work.

Invaluable reviews were provided by Dr. S. Asakawa (Japan), Dr. M. Bonnet-Masimbert (France), Prof. C. Bulard (France), Dr. F. Devillez (Belgium), Dr. D. Donald (South Africa), Dr. V. Enescu (Romania), Dr. G, Eicke (West Germany), Mr. I. Fystro (Norway), Mr. F. Haavisto (Canada), Mrs. G. Saether (Norway), Dr. M. Simak (Sweden), Mr. B. Wang (Canada), and Dr. J. Vozzo (United States). Special thanks are due Dr. Bonnet-Masimbert for help with the French synonyms and Dr. Eicke for help with the German.

Abnormal seedlings. In seed testing, seedlings which do not possess all normal structures required for growth, nor show the capacity for continued development.

Ger. anomale Keimlinge, abnorme Keimlinge

Fr. germe anormal, plantule anormale

Afterripening. Physiological processes in seeds (or bulbs, tubers, and fruits) after harvest or abscission, which occur prior to and are often necessary for germination or resumption of growth under favorable external conditions. (See: Chilling, Prechilling, Stratification.)

Ger. Nachreifen

Fr. postmaturation

Chilling. Subjection of seeds to cold, moist conditions to bring about afterripening. It may occur in natural environments or may be applied artificially. (See: Prechilling, Stratification.)

Ger. Kühlung, Kältebehandlung

Fr. réfrigération

Cotyledon. Modified leaf or leaves of the embryo or seedling, which may contain the stored food reserves of the seed. They are formed at the first node or at the upper end of the hypocotyl.

Ger. Kotyledonen, Samenblatt, Keimblatt

Fr. cotylédon

Dormancy. A physiological state in which a seed predisposed to germinate does not, even in the presence of favorable environmental conditions.

Ger. Keimruhe, Samenruhe, Dormanz, Keimhemmung

Fr. dormance

Dormancy, Combined. Dormancy as a result of two or more primary factors, such as seedcoat dormancy and embryo dormancy.

Ger. Kombinierte Keimruhe

Fr. dormance combinée

Dormancy, Double. Dormancy in both the radicle and the epicotyl of the embryo. To overcome it normally requires a warm treatment followed by chill-

F. T. Bonner is Supervisory Plant Physiologist and Project Leader at the Forestry Sciences Laboratory, USDA Forest Service, Starkville, Mississippi, U.S.A., and the current Chairman of IUFRO W.P. S2.01.06.

ing, or two periods of chilling, interrupted by a warm treatment.
Ger. doppelte Keimruhe
Fr. dormance double

Dormancy, Embryo. Dormancy as a result of conditions within the embryo itself: inhibiting substances, cotyledon influences, impermeable structures. *Syn.*: Internal Dormancy.
Ger. embryonale Keimruhe
Fr. dormance embryonnaire

Dormancy, Imposed. Dormancy as a result of some action, treatment, or injury to seeds in the course of collecting, handling, or sowing. *Syn.*: Secondary Dormancy, Induced Dormancy.
Ger. induzierte Keimruhe
Fr. dormance induite

Dormancy, Induced. *Syn.*: Dormancy, Imposed; Dormancy, Secondary.

Dormancy, Internal. *Syn.*: Dormancy, Embryo.
Ger. innere Keimruhe
Fr. dormance interne

Dormancy, Physiological. An embryo dormancy due to physiological conditions which can be overcome by pretreatments other than scarification.
Ger. physiologische Keimruhe
Fr. dormance physiologique

Dormancy, Secondary. *See*: Dormancy, Imposed; Dormancy, Induced.
Ger. sekundäre Keimruhe
Fr. dormance secondaire

Dormancy, Seedcoat. Dormancy as a result of seedcoat conditions: impermeability to gases or moisture or mechanical restrictions.
Ger. Keimruhe durch die Samenschale
Fr. inhibition tégumentaire

Embryo. The rudimentary plant within the seed; sometimes called the germ.
Ger. Embryo, Keim
Fr. embryon

Empty seed. A seed testing term for a seed unit which does not contain all tissues essential for germination. This condition can result from insect or disease attack, or incomplete development of the ovule. Intact seed coats devoid of internal tissue are considered "empty seeds" under this concept.
Ger. Hohlkorn, tauber Same
Fr. semence vide

Endosperm. Triploid nutrient storage tissue surrounding the embryo in seeds of angiosperms.
Ger. Nährgewebe, Endosperm
Fr. albumen

Epicotyl. Portion of the axis of a plant embryo or seedling stem between the cotyledons and the primary leaves.
Ger. Epikotyl, Keimblattstamm
Fr. épicotyle

Epigeal germination. Germination in which the cotyledons are forced above the ground by the elongation of the hypocotyl.
Ger. epigäische Keimung
Fr. germination épigée

Female gametophyte. Haploid nutrient storage tissue in seeds of gymnosperms. It is often mistakenly called the "endosperm" of seeds of gymnosperms. *Syn.*: Megagametophyte.
Ger. Nährgewebe, wieblicher Gametophyt, primäres Endosperm
Fr. gamétophyte femelle

Filled seed. A seed with all tissues essential for germination.
Ger. Vollkorn, voller Same
Fr. semence pleine

Germination. Resumption of active growth in an embryo which results in its emergence from the seed and development of those structures essential to plant development.
Ger. Keimung
Fr. germination

Germination capacity. Proportion of a seed sample that has germinated normally in a specified test period, usually expressed as a percentage. *Syn.*: Germination percentage
Ger. Keimfähigkeit, Keimkraft
Fr. capacité germinative

Germination energy. That proportion of germination which has occurred up to the time of peak germination, the time of maximum germination rate, or some preselected point, usually 7 test days. (The critical time of measurement can be chosen by several means.)
Ger. Keimschnelligkeit, Keimenergie
Fr. énergie germinative

Germination percentage. *Syn.*: Germination capacity.
Ger. Keimprozent
Fr. pourcentage de germination

Hard seeds. Seeds which remain hard and ungerminated at the end of a prescribed test period because they have not absorbed water, because of an impermeable seedcoat.
Ger. harte Samen
Fr. sememces dures

Hypocotyl. That part of the embryonic axis which is between the cotyledons and the radicle. In seedlings, the juvenile stem which is between the cotyledons and the root system.
Ger. Hypokotyl
Fr. hypocotyle

Hypogeal germination. Germination in which the cotyledons remain in the seed below the ground while the epicotyl elongates.
Ger. hypogäische Keimung
Fr. germination hypogée

Immature embryo. Condition in which a morphologically immature embryo delays germination.
Ger. unreifer Embryo, unterentwickelter Embryo
Fr. immaturité embryonnaire

Imbibition. The mechanism of initial water uptake by seeds. The taking up of fluid by a colloidal system.
Ger. Aufnahme von Wasser, Quellung, Einweichen
Fr. imbibition

Inhibition. A restraining or repression of a function of a seed.
Ger. Verhinderung, Keimhemmung
Fr. inhibition

Integument. The one or two layers of tissue, often fused, that enclose the nucellus of an ovule and that develop after fertilization into seed coats. (*See*: Seed coat.)
Ger. Integument
Fr. intégument

Kernel. Edible portion of a seed embryo or seed storage tissues.
Ger. Kern, Samenkorn
Fr. amande

Megagametophyte. *Syn.*: Female gametophyte.

Micropyle. Minute opening in the integument of an ovule through which the pollen grain or pollen tube passes to reach the embryo sac. It is usually closed in the mature seed to form a superficial scar.
Ger. Mikropyle, Keimloch, Samenmund
Fr. micropyle

Naked stratification. Chilling of seeds without the use of a moisture-holding medium.
Ger. einfache Stratifizierung
Fr. préréfrigération sans milieu

Peak germination. A loose term which describes the specific time when rate of germination is highest. It may be derived in many ways. (*See*: Germination energy.)
Ger. maximale Keimrate, Kulminationspunkt der Keimung
Fr. pic de germination

Pericarp. In Angiosperms, a fruit wall which developed from the ovary wall; it may be dry, hard, or fleshy. (*See*: Seed coat.)
Ger. Fruchtwand, Perikarp
Fr. péricarpe

Physiological maturity. A general term for the stage in the life cycle of a seed when development is complete and the biochemical components necessary for all physiological processes are active or ready to be activated.
Ger. physiologische Reife
Fr. maturité physiologique

Plumule. Primary bud of a plant embryo situated at the apex of the hypocotyl. Portion of the seedling axis above the cotyledons consisting of leaves and an epicotyl, which elongates to form the primary stem.
Ger. Plumula
Fr. plumule, primiéres feuilles

Polyembryony. Formation of two or more embryos from a single ovule in a seed.
Ger. Polyembronie
Fr. polyembryonie

Prechilling. Cold moist treatment applied to seeds to hasten afterripening or to overcome dormancy before sowing in soil or germination in the laboratory. (*See*: Stratification.)
Ger. Kalt-Nass-Vorbehandlung, Kaltevorbehandlung
Fr. préréfrigération, prégermination, stratification froide

Pretreatment. Any kind of treatment applied to seeds to overcome dormancy and hasten germination. (See: Chilling, Prechilling, Stratification.)
Ger. Vorbehandlung
Fr. prétraitement

Purity. Proportion of clean, intact seed of the designated species in a seed lot, usually expressed as a percentage by weight.
Ger. Reinheit, Reinheitsgrad
Fr. pureté

Radicle. Portion of the axis of an embryo from which the primary root develops.
Ger. Keimwurzel, Radikula
Fr. radicule

Sample, submitted. The sample of seed submitted to a seed testing station.
Ger. Einsendungsprobe
Fr. échantillon soumis a' l'analyse

Sample, working. A reduced seed sample taken from the submitted sample in the laboratory, on which some test of seed quality is made.
Ger. engere Mittelprobe
Fr. échantillon moyen, échantillon d'analyse

Scarification. Disruption of seed coats, usually by mechanical abrasion or by brief chemical treatment in a strong acid, to increase their permeability to water and gases, or to lower their mechanical resistance.
Ger. Samenschalenritzung
Fr. scarification

Seed. A matured ovule which contains an embryo and nutritive tissue and is enclosed in protective layers of tissue (seed coat).
Ger. Same, Frucht (Angiosperms only)
Fr. semence, graine

Seed coat. Protective outer layer of a seed derived from the integuments of the ovule (*Syn.*: Spermoderm). When two coats are present, the thick outer coat is the testa and the thin inner coat is the tegmen.
(*See*: Testa, Pericarp.)
Ger. Samenschale, Testa
Fr. tégument externe

Seed lot. A specified quantity of seed of reasonably uniform quality.
Ger. Saatgutpartie
Fr. lot des semences

Seed quality. A general term that may refer to the purity, germination capacity, or vigor of a seed lot.
Ger. Saatgutqualität
Fr. qualité des semences

Sound seed. A seed which contains in viable condition all tissues necessary for germination. *Syn.*: Viable seed.
Ger. Vollkorn, gesunder Same
Fr. semence pleine, semence bonne

Spermoderm. *See*: Seed coat.
Ger. Samenschale, Spermoderm
Fr. spermoderme

Stratification. Practice of placing seeds in moist medium, often in alternate layers, to hasten afterripening or overcome dormancy. Commonly applied to any technique which keeps seeds in a cold and moist environment. (*See*: Prechilling.)
Ger. Stratifizierung, Stratifikation
Fr. stratification

Tegmen. The inner seed coat; usually thin and delicate. (*See*: Seed coat, Testa, Pericarp.)
Ger. Samenhaut
Fr. tégument interne

Testa. The outer coat of a seed, usually hard or tough. (*See*: Seed coat, Tegmen, Pericarp.)
Ger. Samenschale
Fr. tégument externe

Tolerance. A permitted deviation (plus or minus) from a standard. In seed testing, the permitted difference between or among replicated measurements beyond which the measurements must be repeated.
Ger. Toleranz, zulässige Abweichung
Fr. tolérance

Vernalization. Treatment of seeds, bulbs, or seedlings with low temperatures (0 to 5°C) to hasten flowering of the subsequent plant.
Ger. Vernalisation
Fr. vernalisation

Viability. The state of being capable of germination and subsequent growth and development of the seedling.
Ger. Lebensfähigkeit
Fr. viabilité

Viable seed. *Syn.*: Sound seed.
Ger. lebensfähiger Same
Fr. semence viable

Vigor. Those seed properties which determine the potential for rapid, uniform emergence and development of normal seedlings under a wide range of field conditions.
Ger. Triebkraft, Lebenskraft
Fr. vigeur

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