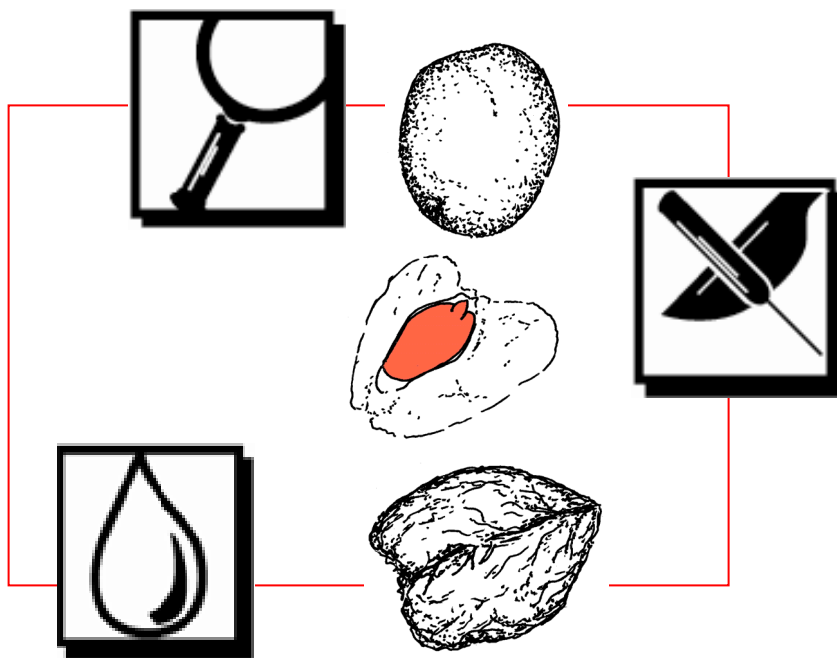


Tetrazolium Testing Handbook



Contribution No. 29

Revised 2000

Updated 2001, 2002, 2004, 2005, 2006, 2007

Tetrazolium Testing Handbook

Contribution No. 29

To the Handbook on Seed Testing



Prepared by

**The Tetrazolium Subcommittee of the
Association of Official Seed Analysts**

**Jack Peters, Editor
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Dedication

This handbook is dedicated to the memory of Philena Heckert,
a botanist, seed analyst, and colleague with the Federal Seed Laboratory.
Her diligence and hard work were a source of inspiration
for the completion of this seed testing resource.

Updated 2001: v, 7, 18, Cactaceae, Cucurbitaceae, Cupressaceae, Lamiaceae, Malvaceae,
Poaceae II, Tiliaceae, Index A and Index B: addition of *Cynodon*, *Cucumis*, and *Nassella*.
Entire lab reference section. Bibliography corrections on Abdul...page and Troneberry... page.

Updated 8/2002: iv, v, 3,4, Amaranthaceae, Apiaceae, Poaceae I, Poaceae II, Poaceae IV
(new), Lab references, Index A and Index B: addition of *Petroselinum*.

Updated 2004: Asteraceae, Fabaceae I, Hydrophyllaceae, Malvaceae, Lab references.

Updated 2005: iv, 9, Fabaceae II, Tropaeolaceae, Index A, Index B. New pages for 2005:
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Updated 2006: 9, Lab references. New pages for 2006: Oleaceae (*Fraxinus*), Malvaceae
(*Sphaeralcea*),

Updated 2007: i-iv, 17-23, Chenopodiaceae, Fabaceae II, Juncaceae, Rosaceae I, Lab
references. New pages for 2007: Poaceae *Agrostis*, Poaceae *Dactylis*, Poaceae *Festuca*, Poaceae
Lolium, Poaceae *Poa*.

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Alphabetized Plant Families

(see next page for the plant families included in this handbook)

APPENDIX

GLOSSARY

INDEX - A [Family/Genus]

INDEX - B [Genus/Family]

LABORATORY REFERENCES

BIBLIOGRAPHY

Plant Families Included in Handbook

<p>A ACANTHACEAE ACERACEAE AGAVACEAE AIZOACEAE AMARANTHACEAE ANACARDIACEAE APIACEAE APOCYNACEAE ASCLEPIADACEAE ASTERACEAE</p> <p>B BALSAMINACEAE BEGONIACEAE BERBERIDACEAE BETULACEAE BIGNONIACEAE BORAGINACEAE BRASSICACEAE I BRASSICACEAE II</p> <p>C CACTACEAE CAMPANULACEAE CAPPARACEAE CAPRIFOLIACEAE CARYOPHYLLACEAE CASUARINACEAE CELASTRACEAE CHENOPODIACEAE CISTACEAE COMMELINACEAE CONVOLVULACEAE CORNACEAE CRASSULACEAE CUCURBITACEAE CUPRESSACEAE CYPERACEAE</p> <p>D DIPSACACEAE</p> <p>E EBENACEAE ELAEAGNACEAE EPHEDRACEAE ERICACEAE EUPHORBIACEAE</p> <p>F FABACEAE I FABACEAE II</p>	<p>FABACEAE III FAGACEAE</p> <p>G GENTIANACEAE GERANIACEAE GESNERIACEAE GINKGOACEAE GROSSULARIACEAE</p> <p>H HAMAMELIDACEAE HIPPOCASTANACEAE HYDROPHYLLACEAE</p> <p>I IRIDACEAE</p> <p>J JUGLANDACEAE JUNCACEAE</p> <p>K</p> <p>L LAMIACEAE LILIACEAE I LILIACEAE II LIMNANTHACEAE LINACEAE</p> <p>M MAGNOLIACEAE MALVACEAE I MALVACEAE II MYRTACEAE</p> <p>N NYCTAGINACEAE NYSSACEAE</p> <p>O OLEACEAE ONAGRACEAE</p> <p>P PAPAVERACEAE PASSIFLORACEAE PEDALIACEAE PINACEAE PLANTAGINACEAE PLATANACEAE PLUMBAGINACEAE</p>	<p>POACEAE I POACEAE II POACEAE III POACEAE IV POLEMONIACEAE POLYGONACEAE PORTULACACEAE PRIMULACEAE PROTEACEAE</p> <p>Q</p> <p>R RANUNCULACEAE RESEDACEAE RHAMNACEAE ROSACEAE I ROSACEAE II ROSACEAE III RUTACEAE</p> <p>S SALICACEAE SAPINDACEAE SCROPHULARIACEAE SIMAROUBACEAE SIMMONDSIACEAE SOLANACEAE <i>Nicotiana, Petunia</i> SPARGANIACEAE</p> <p>T TAXACEAE TAXODIACEAE TILIACEAE TROPAEOLACEAE</p> <p>U ULMACEAE</p> <p>V VALERIANACEAE VERBENACEAE VIOLACEAE VIATACEAE</p> <p>W - X - Y</p> <p>Z ZYGOPHYLLACEAE</p>
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Acknowledgements

The preparation of this handbook began in earnest in the early 1990's by the AOSA Tetrazolium Subcommittee members who compiled the information.

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The following pages of tetrazolium testing principles and procedures (by plant family) represent the combined work and collaborative effort of many seed analysts of the *Association of Official Seed Analysts* and the *Society of Commercial Seed Technologists*. I extend a sincere debt of gratitude to all those individuals, seed laboratories, and seed companies who contributed to this effort.

Thank you.

Jack Peters, Editor

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Direct questions or comments about the contents of this handbook to the AOSA Tetrazolium Subcommittee (see website) or the appropriate laboratory references listed for each family. Newly revised pages and procedures for submitting changes and additions are also available at www.aosaseed.com.

PREFACE

This handbook has been the result of several years of collaboration by many seed analysts in the *Society of Commercial Seed Technologists* and the *Association of Official Seed Analysts*. Many are listed in the acknowledgements. While it has taken many years to develop this edition, the handbook is by no means complete. Additional procedures for plant families not listed in this handbook may be added in future editions.

The intent of the handbook is to offer guidelines and methodologies in tetrazolium testing. The ultimate goal is to provide uniformity in tetrazolium seed testing, with regard to procedures and TZ staining evaluation. Illustrations in the handbook are used to describe seed/embryo morphology, preparation/cutting techniques, and TZ staining patterns. A bibliography at the end of the handbook lists references associated with tetrazolium seed testing.

The handbook's notebook format is intended to encourage further refinement and experimentation with the TZ methods and techniques. Ample space for notes allows analysts to personalize the instructions. Part II is unpaginated to allow easy updates and additions of plant family procedures. It is the committee's hope that analysts will continue to share experiences and improve the handbook by submitting suggested changes to the committee. Periodic additions and changes are the best way to ensure that the handbook will continue to meet the needs of analysts.

Furrows be glad, though earth is bare —
one more seed is planted there.
Give up your strength the seed to nourish —
that in course the flower may flourish.

Besaçon Carol