

**MEMORANDUM OF AGREEMENT**  
between  
**OREGON STATE UNIVERSITY**  
and  
**[COMPANY'S NAME]**  
**A COOPERATOR IN THE**  
**GREAT TREES COOPERATIVE**

**THIS MEMORANDUM OF AGREEMENT** ("Agreement") made between OREGON STATE UNIVERSITY (hereinafter referred to as "OSU") on behalf of its Forest Research Laboratory, and [Company's Name] (hereinafter referred to as "COOPERATOR")(individually, "Party," and collectively, "Parties"), for COOPERATOR to join the Genetic Research on Engineering Advanced Transformation of Trees ("GREAT TREES") Cooperative and accept the major elements of support and cooperation expected from the organizations officially participating in the GREAT TREES Cooperative program. The scope of this research effort is outlined in the latest "GREAT TREES Research Program" which is attached and incorporated into this Agreement.

This Agreement replaces and supersedes all previous Agreements between OSU and COOPERATORS for the Tree Genetic Engineering Research Cooperative (TGERC) or the Tree Biosafety and Genomics Research Cooperative (TBGRC), as described in TGERC and TBGRC Reports and meeting notes available to COOPERATORS.

**WITNESSETH:**

**WHEREAS**, an improved understanding of genetic engineering of trees is deemed mutually beneficial to COOPERATOR and OSU alike; and

**WHEREAS**, OSU is interested in pursuing the objectives of GREAT TREES, namely:

1. Improved gene transfer and regeneration efficiency;
2. Emphasis on eucalypts as the primary, and poplar as the secondary, research subjects; and
3. Work on genetic containment, with the goal of completion of previously started research under the prior TBGRC Cooperative (2004-2019).

**WHEREAS**, COOPERATOR wishes to participate in the research program, as outlined in Appendix I attached hereto.

**WHEREAS**, COOPERATOR desires to make to OSU, contributions for the purpose of partially supporting such research; and

**WHEREAS**, OSU is willing to accept such contributions for the purpose of conducting such research;

**NOW THEREFORE**, it is mutually agreed as follows:

**ARTICLE I. RESPONSIBILITIES OF OSU**

- A. With advice from COOPERATORS, provide overall leadership and coordination of GREAT TREES activities. Such functions will include:
  - 1. Identify research needs and set priorities.
  - 2. Plan and implement research projects.
  - 3. Analyze, interpret and report the results of GREAT TREES studies.
  - 4. Serve as a liaison to various organizations and individuals with expertise in plant genetic engineering and other pertinent interests.
  - 5. Provide leadership for GREAT TREES Meetings.
  - 6. Schedule and moderate GREAT TREES online and other Meetings.
  - 7. Administer the financial, professional and material resources available to GREAT TREES program in a cost-effective manner.
  - 8. Ensure that all GREAT TREES activities comply with legal, regulatory and administrative requirements, and that they are conducted in a safe manner.
  
- B. Provide a forum for exchange of information.
  - 1. Serve as a focal point of information exchange on tree genetic engineering.
  - 2. Publish and distribute the results of GREAT TREES-sponsored scientific experiments in collaboration with interested participants in an appropriate manner.
  - 3. Prepare a presentation at each meeting that summarizes the accomplishments and plans for the GREAT TREES program.
  - 4. Provide training opportunities for Cooperator staff through visits and enrollment of qualified students. Arrangements and terms for such training are to be handled under separate agreements between OSU and Cooperator.
  
- C. Provide scientific expertise in support of GREAT TREES objectives.
  - 1. Provide sound experimental methods for GREAT TREES studies.
  - 2. Ensure a high degree of quality control and uniformity in the installation, measurement and analysis of GREAT TREES studies.
  - 3. Provide technical guidance in the implementation of research findings into practice.
  - 4. Provide advice, documentation, and education to improve public understanding and policies on tree genetic engineering regulation and related scientific issues.
  - 5. Propose research projects to meet Cooperator needs that are tailored to the interests of specific companies. Such projects will be presented to all companies, but funded projects will be managed according to OSU policy on sponsored projects/programs, separate from GREAT TREES activities.

## **ARTICLE II. RESPONSIBILITIES OF COOPERATOR**

- A. Serve in an advisory capacity for items such as program direction and emphasis, level of support, compatibility with other research programs, resolution of conflicts, and other general issues.
- B. Formally agree to hold information related to GREAT TREES research programs that are provided to Cooperators by OSU staff, faculty, and students as confidential, as outlined below.
- C. Provide technical suggestions for pursuing GREAT TREES objectives.
- D. Respond in a prompt, timely manner to GREAT TREES related inquiries.
- E. Where feasible, and at the discretion of each Cooperator, provide in-kind support (such as plant materials, transformation methods, *in vitro* media recipes, study sites, propagation services, greenhouses, labor, equipment, analytical expertise, and materials) for aiding, installing, or evaluating GREAT TREES studies.
- F. For Regular Members, provide financial support in the form of contributions to OSU. The annual contributions will be a base membership fee of US \$30,000/year, with a commitment of at least two years of support upon initial membership. Approximately one-half of the base fee will support infrastructure and associated personnel needed to conduct high quality, government authorized field and greenhouse trials, and the remaining half will be allocated to scientific projects based on COOPERATOR interests and votes at meetings. COOPERATORS may increase the amount of future contributions in conjunction with any meeting of GREAT TREES by majority vote of all of the Regular Members. All annual payments shall be subject to an OSU-mandated indirect cost rate of 17.5% on total direct costs that will remain in effect for at least 5 years. After five years, any changes in indirect cost rates will be accompanied with an updated MOA that will supersede this document.
- G. Subject to the permission and sole discretion of COOPERATOR, permit the use of study sites for visits, tours and demonstration areas which are directed and arranged by OSU.
- H. One payment will be made annually by COOPERATOR. OSU will issue an invoice before February 1 of each year. Payments must include the invoice number, the name GREAT TREES COOP in the College of Forestry, and will be wired or checks sent in paper mail within 30 days of invoice receipt and should be mailed to:

*Oregon State University  
Office for Sponsored Research and Award Administration  
A312 Kerr Administration Building  
Corvallis, OR 97331*

*OSU will provide information needed for wire transfers upon request.*

### **ARTICLE III. MUTUAL RESPONSIBILITIES OF COOPERATOR AND OSU**

- A. Provide technical guidance and support to meet GREAT TREES objectives.
- B. Provide and exchange information where necessary to meet requirements for experimentation and documentation.
- C. Communicate promptly via email and other means.
- D. Foster a spirit of cooperation toward achieving the objectives of the GREAT TREES program.

### **ARTICLE IV. MEMBERSHIP**

Membership is open to any firm or public agency. There will be two classes of members, Regular and Associate.

- A. **Regular Members** are industries or public agencies that contribute direct financial support to GREAT TREES. Regular members have representation during science and business sessions at meetings, access to all GREAT TREES information, and intellectual property advantages such as review of information for patenting and favored royalty status. (Favored royalty status means that OSU will not license to other parties in terms as favorable, or more favorable, than to COOPERATORS.) Any **Affiliate** (defined below) of a GREAT TREES Regular Member may participate in GREAT TREES. The GREAT TREES Regular Member and its **Affiliates** will share one vote on GREAT TREES policy and business matters. Government agencies that support GREAT TREES will be given the voting rights of Regular GREAT TREES Members so long as their annual contributions to OSU for GREAT TREES research are equal to or exceed the contributions of Regular Members. Regular Members and the Director will participate in meeting science and business Sessions; however, others may also be invited to participate if approved by majority vote of Regular Members. Business meetings will be held on an as needed basis. Regular Members may also elect to have a closed session at any business meeting, based on majority vote, to encourage frank discussions of strategic directions and finances (no OSU staff present). The leadership of such meetings will be rotated among Full Members.

COOPERATORS may accelerate GREAT TREES research by acquiring additional Base Memberships, each requiring the same total annual fee per Membership of \$30,000, and not exceeding three such Memberships. Each Membership will give the Regular Member an additional vote during business sessions of the annual meeting but no other additional rights.

- B. **Associate Members** are individuals or organizations who aid GREAT TREES by providing in-kind assistance, including needed information, materials, and services but no direct financial contributions. They have access to GREAT TREES-generated information for research purposes only, but no advantages with respect to licensing of products. They may serve on the Scientific Advisory Committees where they contribute to discussion, but will not attend business sessions unless an exception is made by majority vote of Regular Members and endorsement of the Director, and do not have voting rights. Associate Membership is offered at the discretion of the Regular Membership, and requires approval by a 2/3 or more vote of the Regular Members. Associate Membership must be renewed by voting at the start of each five year operating period of GREAT TREES. Associate Members who cease to make significant contributions to GREAT TREES may be removed at any time by a vote of 2/3 or more of the Regular Members.
- C. For purposes of this Agreement, “**Affiliate**” shall mean, with respect to a Regular Member, any company, corporation, limited liability company, partnership, or other entity which, directly or indirectly, through one or more intermediaries, controls, is controlled by, or is under common control with, such Regular Member. For purposes of the foregoing sentence, “control” shall mean the direct or indirect ownership of thirty percent (30%) or more of the equity interest or voting interest in such entity.

#### **ARTICLE V. PROTECTION OF RIGHTS AND PRIVILEGES**

- A. Information collected through the GREAT TREES program will be consolidated, analyzed and reported through OSU. Apart from preliminary reports provided during GREAT TREES annual or semi-annual meetings, information will generally not be released until it has undergone thorough analysis, interpretation, and editing by OSU; at that point, such information as well as such analysis, interpretation, and edited content will be available to all COOPERATORS.

This Agreement does not limit COOPERATOR’s ability to take licenses from third parties for intellectual property not developed through GREAT TREES; it also does not limit COOPERATOR’s participation in other enterprises that involve tree genetic engineering in commercial or academic settings.

- B. Publication and intellectual property. OSU shall have the right, responsibility and final authority to publish any and all findings it deems of scientific merit and validity. Publication of results in the scientific literature will be the primary mode of documentation. COOPERATOR may collaborate in this endeavor, and/or it may perform independent analyses of data obtained from studies it is directly participating in and may report such results independently, acknowledging in full the assistance and information provided by OSU personnel. By the same token, any assistance and information provided by COOPERATOR will be properly acknowledged in publications and theses by OSU personnel.

Materials and information produced by GREAT TREES shall not be for the sole use of any individual COOPERATOR. Engineered materials produced by GREAT TREES shall be used by COOPERATOR for research purposes only, unless commercial agreements between COOPERATOR and OSU are subsequently made. Such subsequent agreements may include provisions for any parties to use the engineered plant materials produced by GREAT TREES for commercial gain, provided that it is authorized by entities with specific proprietary rights invested in the materials (e.g., those with ownership of an incorporated gene, the germplasm used, or has a patent on the engineered plant material).

COOPERATORS shall have opportunity to review manuscripts and other documents relating to patenting (subject to confidentiality). Each COOPERATOR shall have an opportunity and option to obtain at least a non-exclusive, royalty-bearing, irrevocable, worldwide license which license will contain a provision for reimbursement of a pro rata share of OSU patenting expenses. OSU will not license technology to non-Regular Members on business terms as favorable, or more favorable than to COOPERATORS. No COOPERATOR shall be eligible for the above considerations on a patent filed by OSU when COOPERATOR was not a GREAT TREES Regular Member.

COOPERATORS who withdraw from GREAT TREES lose their rights to these considerations, but may regain such rights by rejoining GREAT TREES if the technology resulted from a patent filed while COOPERATOR was a Regular Member of GREAT TREES when the majority of the relevant research was conducted. If licensing technology to non-COOPERATORS and/or rejoining COOPERATORS is considered, licensing fees will be determined by OSU on a case-by-case basis taking into consideration the involvement and support of the Cooperator.

Final decision to seek patent protection rests solely with OSU. Even if protection is obtained by OSU for a process or a plant genotype, it may be subject to other proprietary rights; these will be negotiated directly between interested COOPERATORS and relevant property holders.

All technology developed with support from Federal agencies shall be subject to the provisions of Public Laws 96-517 and 98-620.

COOPERATORS will consider intellectual property interests in a timely manner. OSU may delay publication for up to 60 days following written notice of intent to publish, to allow COOPERATORS to consider their intellectual property options. Such written intent to publish may take the form of a draft manuscript, an abstract, or a poster for a scientific meeting sent via electronic means. If an individual COOPERATOR elects to support OSU in seeking patent protection, then all other COOPERATORS shall have up to 60 days to make a decision to participate from the date OSU informs them of the proposed action.

- C. Any COOPERATOR may inspect the data or procedures of any GREAT TREES study, subject to the confidentiality requirements in this Agreement and of cooperating parties.
- D. Activities and policies of GREAT TREES are public information and may be freely publicized by COOPERATORS and by OSU. However, when publicizing GREAT TREES, OSU will make no reference to specific COOPERATOR actions, interests and policies without prior written consent from COOPERATOR. Also, reference to GREAT TREES or OSU in advertising will not be made by COOPERATOR without prior written consent of OSU. OSU may, however, cite GREAT TREES membership at any time when publicizing the GREAT TREES's structure, goals and accomplishments.

## **ARTICLE VI. CONFIDENTIAL DISCLOSURE**

This article pertains to all verbal and written communication within the GREAT TREES cooperative. Such communication will generally be in the form of information provided by OSU staff at GREAT TREES meetings and in written communications from OSU to COOPERATOR(S) associated with membership in GREAT TREES, but may also take the form of information from one COOPERATOR being shared with other COOPERATORS for GREAT TREES purposes.

### **A. Definitions:**

1. "Confidential Information" means information which derives its value from not being generally known -- including without limitation data, know-how, formulae, processes, designs, sketches, photographs, plans, drawings, specifications, samples, reports, customer lists, price lists, studies, findings, inventions or ideas – and for which the Disclosing Party has given notice to the Receiving Party of the confidential nature of the information by marking the written document as confidential, or, in the case of information in intangible form, reducing the information to written summary form having confidential marking and providing such summary to the Receiving Party within thirty (30) days of initial disclosure.
2. "Disclosing Party" means the Party disclosing Confidential Information to the Receiving Party.
3. "Receiving Party" means the Party receiving Confidential Information from the Disclosing Party.

### **B. Confidentiality Provisions:**

1. Duty of Confidentiality. RECEIVING PARTY agrees to receive in confidence Confidential Information disclosed to it by the Disclosing Party. Internal dissemination of the Disclosing Party's Confidential Information by the Receiving Party shall be limited to those employees whose duties justify their need to know such Confidential Information and then only on a basis of a clear understanding by those employees of their obligation to maintain the confidential status of such Confidential Information and to restrict the

use of such Confidential Information solely to the limited use agreed upon between the Parties under this GREAT TREES Agreement. Receiving Party may share Confidential Information with its own Affiliates and legal advisors, provided that they are bound by a duty of confidentiality or professional responsibility of confidentiality at least as restrictive as this Agreement. Receiving Party shall bear all legal responsibility for the actions of its employees, Affiliates, and legal advisors with regards to the Confidential Information. Receiving Party shall not disclose Confidential Information to a third party.

2. **Rights of Disclosing Party.** The amount and nature of Confidential Information to be disclosed is completely within the discretion of the Disclosing Party. The Receiving Party acknowledges that all Confidential Information received from the Disclosing Party is the exclusive property of the Disclosing Party, and that this Agreement does not grant a license or option to the Receiving Party under any patent or other intellectual property rights held by the Disclosing Party.
3. **Term of Confidentiality.** The obligations of confidentiality under this Agreement are effective until ten (10) years from the date of disclosure of the Confidential Information, and shall survive termination of COOPERATOR's membership in GREAT TREES for the duration of the obligation of confidentiality given above.
4. **Exceptions to Duty of Confidentiality.** Receiving Party owes no duty of confidentiality to Disclosing Party for information:
  - a. that is, at the time of disclosure, generally known to the trade or to the public;
  - b. that was Confidential Information at the time of disclosure but becomes generally known to the trade or to the public at a later date through no contract breach or other fault of Receiving Party, and then only after said later date;
  - c. that is possessed by Receiving Party on or before disclosure by Disclosing Party, as evidenced by Individual's written or other tangible evidence; or
  - d. that was Confidential Information at the time of disclosure but is disclosed to Receiving Party in good faith by a third party who has an independent right to such information.
5. **Compelled Disclosure.** In the event that the Receiving Party becomes compelled by law, including without limitation the Oregon Public Records Law (ORS 192.311 - 192.355), to disclose any of the Disclosing Party's Confidential Information, the Receiving Party may disclose it without breach of this Agreement, provided that the Receiving Party discloses only that portion of the Confidential Information that is legally required to be disclosed, and exercises all reasonable efforts to obtain reliable assurances from the compelling authority that confidential treatment will be afforded to the disclosed Confidential Information. To the extent allowed by law, the Receiving Party shall promptly notify the Disclosing Party of the compulsion and provide reasonable assistance to the Disclosing Party, at the Disclosing Party's expense, in any effort to obtain a protective order or other appropriate remedy from the compelling authority.

6. The Receiving Party shall adhere to all U.S. Export Administration Laws and Regulations and shall not export or re-export any technical data or product(s) received from the Disclosing Party, or the direct product(s) of such technical data to any proscribed country listed in the U.S. Export Administration Regulations unless properly authorized by the U.S. Government.
7. Upon request of the Disclosing Party and in any event upon the termination of the relationship between the parties, the Receiving Party will either deliver to the Disclosing Party or destroy and certify such destruction all memoranda, notes, records, tapes, documentation, disks, manuals, files of other documents and all copies of the same, concerning or containing Confidential Information that are in the Receiving Party's possession, whether made or compiled by the Receiving Party or furnished to the Receiving Party by the Disclosing Party. Notwithstanding the foregoing, the Receiving Party may retain one (1) copy of Confidential Information in its legal office for the sole and exclusive use of ensuring legal compliance; and additionally, Receiving Party has no duty to destroy electronic backup copies of Confidential Information that may reside on Receiving Party automatic backups, provided that such backups are controlled by a central Information Technology office and are not generally accessible to end users of Receiving Party network resources without administrative authorization.
8. Notwithstanding anything herein to the contrary, OSU's confidentiality obligations are subject to the limitations and conditions of the Oregon Public Records Law (ORS 192.410 - 192.505).
9. Any breach of this Article VI by the Receiving Party may result in irreparable damage to the Disclosing Party for which the Disclosing Party may not have an adequate remedy at law. Accordingly, in addition to any other remedies and damages available, the Disclosing Party may immediately seek enforcement of the provisions of this Article VI by means of specific performance or injunction, without any requirement to post a bond or other security.

## **ARTICLE VII. INDEMNITY**

Subject to the limitations and conditions of the Oregon Tort Claims Act, ORS 30.260 through 30.300, OSU shall hold and save harmless COOPERATOR, its officers, agents, and employees from damages arising out of the tortious acts of OSU's officers, agents, and employees acting within the scope of their employment and duties in performance of this Agreement.

COOPERATOR shall hold and save harmless OSU, its officers, agents, and employees from damages arising out of the tortious acts of COOPERATOR's officers, agents, and employees acting within the scope of their employment and duties in performance of this Agreement.

IN NO EVENT SHALL EITHER OSU OR COOPERATOR BE LIABLE TO THE OTHER OR TO THE OTHER COOPERATORS FOR LOST PROFITS OR LOST SAVINGS, OR FOR ANY PUNITIVE, EXEMPLARY,

INCIDENTAL, CONSEQUENTIAL, OR SPECIAL DAMAGES, EVEN IF NOTIFIED IN ADVANCE OF SUCH POSSIBILITY.

#### **ARTICLE VIII. TERMS OF AGREEMENT AND RENEWAL**

Unless written termination notice as specified below is given, or superseded by a revised or updated agreement, this General Memorandum of Agreement shall be automatically renewed at annual intervals coinciding with the OSU fiscal year (i.e., July 1 of each calendar year).

#### **ARTICLE IX. AMENDMENT**

This Agreement may be amended by a 2/3 vote of Regular Members in favor of the amendment combined with agreement by OSU to the amendment. An amendment becomes effective the OSU fiscal year (i.e., July 1 of each calendar year) following vote and agreement.

#### **ARTICLE X. TERMINATION**

- A. In the event of unforeseen emergencies or dissatisfaction with GREAT TREES, COOPERATOR may restrict or discontinue participation. This includes, without limitation, the right to discontinue in-kind contributions and attendance at meetings, **provided that notice is given in writing at least 60 days in advance, and provided that as specified above funds are provided for an initial two years of support.** If notice to terminate membership is not provided to OSU in writing **by March 1**, COOPERATOR's annual contribution for the following fiscal year (July 1-June 30) is due and is non-refundable, as OSU may have committed to annual salary contracts and other obligations based upon the expectation of COOPERATOR's contribution to the GREAT TREES budget.

If COOPERATOR withdraws from GREAT TREES and subsequently wishes to rejoin, COOPERATOR must repay all remaining unpaid contributions for missed annual periods. Such repayment shall reinstate COOPERATOR's rights and privileges in GREAT TREES.

- B. OSU may also cease or restrict its participation in GREAT TREES at the end of a fiscal year (June 30) if adequate financial and in-kind support from COOPERATORS is not forthcoming, or if it is in the best interests of OSU to do so. OSU must notify COOPERATORS in writing of its intent to cease or restrict participation as soon as possible but no later than May 1 of the fiscal year.

**ARTICLE XI. COUNTERPARTS; ELECTRONIC SIGNATURES; FORMAT; DELIVERY.**

Unless prohibited by law governing COOPERATOR, this Agreement:

May be executed in one or more counterparts, each of which will be deemed an original and all of which together will constitute one and the same Agreement;

May be signed with electronic signature conforming to controlling law, such signature having the same force and effect by all parties as an original signature; and

May be delivered in or by facsimile, Adobe® Portable Document Format (PDF), or other legible electronic format, and when so delivered will have the same force and effect as delivery of an original signature.

**ARTICLE XII. SURVIVAL.**

Articles V.B, V.D, and 6 shall survive termination of this Agreement.

**ARTICLE XIII. MERGER.**

THIS AGREEMENT CONSTITUTES THE ENTIRE AGREEMENT BETWEEN THE PARTIES AND SUPERSEDES ALL PREVIOUSLY-EXECUTED GREAT TREES, TBGRC, AND TGERC AGREEMENTS. NO WAIVER, CONSENT, MODIFICATION OR CHANGE OF TERMS OF THIS AGREEMENT SHALL BIND ANY OF THE PARTIES UNLESS IN WRITING AND SIGNED BY ALL PARTIES. SUCH WAIVER, CONSENT, MODIFICATION OR CHANGE IF MADE SHALL BE EFFECTIVE ONLY IN THE SPECIFIC INSTANCE AND FOR THE SPECIFIC PURPOSE GIVEN. THERE ARE NO UNDERSTANDINGS, AGREEMENTS OR REPRESENTATIONS, ORAL OR WRITTEN, NOT SPECIFIED HEREIN REGARDING THIS AGREEMENT. EACH ENTITY'S REPRESENTATIVE, BY SIGNATURE BELOW, ACKNOWLEDGES THAT HE/SHE HAS READ THIS AGREEMENT, UNDERSTANDS IT AND OBLIGATES THE ENTITY HE/SHE REPRESENTS TO BE BOUND BY THE TERMS AND CONDITIONS OF THIS AGREEMENT.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement as of the last date provided below.

**COOPERATOR**

**OREGON STATE UNIVERSITY**

_____	_____	_____	_____
Name:	Date	Kathleen L. Kavanagh	Date
Title:		Associate Dean of Research	
		College of Forestry	
_____		_____	_____
		Authorized Signing Official	Date

## Appendix I

### GREAT TREES RESEARCH PROGRAM

*FOR PHASE VI: July 2019-June 2024*

The expected goals of GREAT TREES work are described below, with specific studies and allocation of effort to vary depending on funding, advice from Cooperators, and discretion of the Director. Due to the rapid pace of progress in genomics and biotechnology, scientific approaches, both strategically and tactically, are likely to change over time based on new advances.

This general plan was presented and supported at the July 2017 meeting of TBGRC Coop Members (online).

**Major project:** *Developmental genes as methods to enhance gene editing and transformation in eucalypts*

1. Using transcriptome, bioinformatics, and scientific literature searches, identify genes whose expression is likely to significantly influence the rate of *in vitro* regeneration or transformation (RT) of tree cells.
2. Create constructs using one or more genes identified in 1. above that are expected to influence RT, and which generally contain reporter genes that facilitate recognition and quantification.
3. Test the effects of these genes *in vitro* or *in vivo* using eucalypt or as a comparator poplar plant tissues, and characterize the kind and frequency of responses.
4. Develop and test accessory technology to control and limit RT-modifying gene expression, such as promoters, insulators, inducers, and recombinases.
5. Develop and test accessory technology that is likely to affect RT, such as various growth media and transformation treatments.
6. Adapt and test the technology used to control RT genes for the improvement and removal of gene editing elements, such as CRISPR/Cas systems.