

## ECPGR *Allium* Working Group

### Progress report for the period June 2006 – June 2008

*Allium* was chosen as one of the 4 ECPGR Working Groups for study as crop exemplars in the AEGIS project. The AEGIS *Allium* group chose to concentrate their efforts on the development of an AEGIS strategy for the vegetatively propagated *Allium* taxa and in particular garlic. A majority of the AEGIS *Allium* group are also ECPGR National *Allium* Coordinators and members of the *Allium* Working Group. The AEGIS *Allium* group is led by the European *Allium* database (EADB) manager. The *Allium* Working Group in Phase VII was rated a low priority working group. The WG partners agreed to use a majority of the WG funds in support of a meeting to discuss and make recommendations on the report of the AEGIS *Allium* group. This proved to be particularly productive because it led to the development of a successful EU GENRES project EURALLIVEG coordinated by Dr Joachim Keller, IPK, Germany. The ECPGR *Allium* WG is involved through several partners in this EU project. A majority of the formal WG activities have concentrated on the vegetatively propagated taxa. However, the national programmes maintaining the seed propagated *Allium* crops and wild taxa have continued to progress all aspects of their conservation, albeit at different rates.

<b>I. RESULTS</b>			
<b>a. Comparison of workplan (milestones) versus results obtained</b>			
Workplan (milestones)	Which results have been obtained?	Which aims/goals have not been (fully) reached?	Completeness ratio (%)
WG partners will make sure that national <i>Allium</i> data are incorporated into national inventories for inclusion into EURISCO. The EADB will be created from EURISCO for use by the group.	The EADB has been rebuilt using data from EURISCO and national programmes. The EADB was updated in 2007 including new & revised data sets from France, Germany, Nordic Gene Bank, Poland & Portugal to meet the needs of the AEGIS & EURALLIVEG projects. The EADB 2007 now contains data for 14,035 accessions from 36 institutions in 25 countries.	The EADB 2007 represents the broadest representation of data for the gene pool of <i>Allium</i> achieved in Europe, but some countries with <i>Allium</i> collections have not included their data in EURISCO nor forwarded the data to the EADB manager.	100% of available data in EADB, but a few remaining data sets have not been acquired.
Characterization will be conducted mainly on vegetatively propagated material to support the rationalization, duplicate tracing and formation of core collections	A significant level of characterization of both seed & vegetatively propagated material has been achieved by national programmes. In addition, preliminary molecular characterization was carried out on some garlic collections as a precursor for AEGIS and the EURALLIVEG project. Taxonomic determination of the IPK wild <i>Allium</i> collections has been done by IPK specialists to validate botanical identity.	The EURALLIVEG project started in April 2007 and incorporates molecular characterization of a significant proportion of the European garlic and shallot collections. The project partners started this phase of the work in spring of 2007. The EURALLIVEG project will continue during Phase VIII of ECPGR.	EURALLIVEG will fingerprint 70% of available European garlic accessions.

<p>Tracing of duplicates in collections.</p>	<p>Tracing of duplicates is especially important for vegetatively propagated material because of the impact on labour use and funding. The EURALLIVEG project is using the EADB2007 to tag true duplicates of garlic &amp; shallot distributed between institutions as safety duplicates under the ECPGR &amp; GENRES projects. The accessions in a majority of the main garlic &amp; shallot collections (7 institutions from 6 countries plus the Nordic Gene Bank) to be taken forward to the molecular screen in EURALLIVEG. The officially acknowledged duplicates were confirmed as they are in the EADB2007. As molecular screening proceeds on all material of the partners no further formal duplicate search in the database was necessary so far. After the completion of the molecular data the duplicates identified will be compared with EADB.</p>	<p>Currently there is a delay of about 6 months in EURALLIVEG molecular analyses because of technical reasons.</p> <p>A few important garlic collections are not involved in the EURALLIVEG project. It is hoped that the AEGIS project and Phase VIII will provide the impetus to include these collections in the molecular screen. The molecular results will provide the information necessary to identify vegetative duplicates and underpin the development of European collections and safety duplicates of garlic and shallot.</p> <p>It is proposed that the accessions of countries not participating in EURALLIVEG and, therefore, absent from the analyses will be analysed using the WG project funds of the VEGNET budget.</p>	
<p>Regeneration - focused on vegetatively propagated material.</p>	<p>Routine maintenance of vegetative material has continued in a significant number of national collections generally in field collections. Regeneration of vegetatively propagated material through a division of labour within EURALLIVEG Consortium, currently Czech Republic, Germany &amp; Poland includes material in-vitro for disease elimination and development of the techniques for the cryo preservation for garlic.</p> <p>Many national programmes have continued to regenerate seed accessions and to store the seed produced under long-term conditions following FAO/IPGRI guidelines. This work is reflected in the record number of accessions included in the EADB2007.</p>	<p>No Memorandum of Understanding has been signed between the National Programmes under the AEGIS programme. Practical steps to divide the workload within the Conservation Consortium could not be realized. The <i>Allium</i> working group does not have legal competence to organize any of the proposed actions without the expressed willingness of the respective national programmes. Thus, the EURALLIVEG project will move towards the technical requirements of establishing European cryo collections of garlic &amp; shallot.</p>	

		However, the ultimate success of this project will depend upon national programmes providing support for facilities & manpower.	
Use of Modern Technology	<p>The ECPGR &amp; AEGIS <i>Allium</i> WGs have promoted the use of molecular fingerprinting, <i>in vitro</i> culture for disease elimination &amp; cryopreservation for conservation for clonal accessions. The EURALLIVEG project grew out of our recommendations to build on the cryopreservation expertise available in the Czech Republic, Germany &amp; Poland and the molecular expertise in Germany &amp; the Netherlands. The partners recognized the value of high technology (molecular fingerprinting &amp; cryo-preservation) to develop European collections of disease-free cryo preserved garlic &amp; shallot. Joachim Keller coordinated a successful bid in the 2<sup>nd</sup> Call of the EU regulation 870/2004 for the EURALLIVEG project. This GENRES project has the potential to provide one of the first practical examples of a functional European collection..</p>	<p>The EURALLIVEG project (2007-2010) will support financially the establishment of proto-European garlic &amp; shallot collections.</p> <p>EURALLIVEG does not have the funds to support non-partner involvement or the inclusion of their material in the work of fingerprinting &amp; virus eradication in preparation for cryo preservation. The AEGIS project meeting in July 08 will include reps from Portugal &amp; Spain, and the Allium WG proposal for Phase VIII will address these issues.</p> <p>In the longer term European collections will require the political and financial support of either the respective national programmes or other international bodies in order to maintain the facilities and required level of technical staff to maintain the European collections &amp; safety duplicates.</p>	
The wild species genepool will be structured according to the relevance of the species for utilization and breeding of the crop species.	Documentation and initial characterization of seed & vegetatively propagated wild taxa have been effective in some national programmes. IPK has published several articles and summaries on the use of wild <i>Allium</i> species for various purposes.	No significant discussion has been conducted within the Allium WG because in general the wild taxa have a low priority currently. The WG members have research strategies for the wild taxa, but no financial support to carry out this work. However, national programmes have not developed strategies to decide how to conserve these wild gene pools and how to prioritize the more important wild species.	

		Additional funds would be necessary to develop relevant strategies.	
<b>b. Contribution to the four ECP/GR priorities for Phase VII</b>			
<p>1. Characterization/evaluation (including modern technologies)  There has been significant characterization of <i>Allium</i> germplasm in various national programmes, but no coordinated effort across the working group.  The EURALLIVEG project is providing a major step towards fingerprinting a large proportion of the European garlic and shallot collections. This molecular characterization will form the basis of decision making for the development of the European collections.  Any other characterization eval worth mentioning?</p>			
<p>2. Task sharing: Our efforts in the WG have concentrated on the vegetatively propagated crops. Members of the <i>Allium</i> WG have been involved in AEGIS &amp; the EU EURALLIVEG project providing a unified approach across groups to the development of European collections of garlic and shallot. The AEGIS project provided impetus for the low priority <i>Allium</i> WG to develop a strategy for creating and maintaining European vegetative <i>Allium</i> collections. Three national programmes (Czech Republic, Germany &amp; Poland) collaborated to develop the methods for the cryopreservation of garlic. The WG vegetative subgroup agreed to promote cryopreservation as the method of choice for the conservation of vegetatively propagated <i>Allium</i> taxa. The AEGIS <i>Allium</i> group, in consultation with the ECPGR <i>Allium</i> vegetative subgroup, has produced a strategy for the implementation of duplicate identification of garlic in European collections and their subsequent long-term storage in cryopreservation. The ECPGR funded the European <i>Allium</i> database manager to attend the 1<sup>st</sup> project meeting of EURALLIVEG to assist the discussion on the identification of clonal duplicates.</p>			
<p>3. <i>In situ</i>/on-farm conservation and development  There was no coordinated effort by the WG in this area, however, local development projects for on-farm conservation &amp; participatory breeding have been established in France, Hungary and Poland</p>			
<p>4. Documentation and information  The European <i>Allium</i> database was rebuilt based mainly on data sets received from national <i>Allium</i> coordinators augmented by data from EURISCO. The EADB2007 holds passport data for 14,035 accessions from 36 institutions in 25 countries. We have used the EADB in collaboration with the EURALLIVEG project to identify true duplicate accessions in the main garlic &amp; shallot collections.</p>			
<b>c. Relevance (regional / international)</b>			
<p>Did your work and/or outputs have inter-regional dimension? (if it did, give precisions)  Can we say here that the molecular fingerprinting and the cryo-preservation techniques developed in EURALLIVEG, and the strategy for the maintenance of a European garlic collection from the ECPGR/AEGIS <i>Allium</i> WGs will be valuable models for other collaborative groups.  Cryopreservation as a technique is applicable to a range of clonal crops including potato, strawberry and some (if not all) clonal woody fruit crops. Initiatives are underway for potato genebanks in Germany &amp; the Czech Republic; and apple &amp; strawberry work is at least in the research stage.  Networks could be constructed of the respective crops when more than one lab is working with that, first collaborative activities are at least initiated in potato and strawberry.</p>			
<b>d. Lessons learnt (recommendations)</b>			
<p>Which lessons learnt are also relevant for other Working Groups?  The lessons learned from the situation of vegetatively propagated alliums are valid for all other vegetatively propagated crops, e.g. potato, fruit crops including grapes &amp; hop and some minor crops. In all these cases, cryopreservation would be the most economic and, therefore, the simplest way to store germplasm providing shared activities and mutual benefit.   As a low priority WG we benefited hugely from members involvement in the AEGIS programme and the EU EURALLIVEG project. A majority of the positives reported here result from involvement in these collaborations.</p>			

<b>II. ANALYSIS</b>	
<b>a. Bottlenecks</b>	
<b>What were the experienced bottlenecks?</b>	<b>How do you plan to solve the bottlenecks?</b>
<p>The bottlenecks listed in our Mid-term report for cryopreservation; molecular markers &amp; virus elimination have been solved to a large extent by the success of the GENRES EURALLIVEG project providing funds for a number of national programmes. However, there is a need to include those national vegetative Allium collections not in the EURALLIVEG project in the prescreening work for the development of European collections.</p> <p>In the longer term, the routine application of new biotechnological methods requires stable funding over longer periods than is possible based on short-term projects of 2-4 years. It will be necessary to support the planning and implementation of a strategy targeted over 10 years covering sequentially molecular characterization, virus elimination, tissue culture and cryopreservation. The AEGIS vision is not possible with short-term projects.</p>	<p>We will promote our strategy for the conservation of European vegetative Allium collections in AEGIS and intend to target project funds in the VEGNET of ECPGR Phase VIII to include additional garlic collections in the EURALLIVEG project model.</p> <p>In the longer term the success of AEGIS will depend upon national programmes accepting a shared responsibility for the maintenance of European collections. For vegetative collections in cryopreservation this strategy may place a disproportionate burden on a few national programmes, but without such commitment the strategy will not function.</p>
<b>b. Internal support needed (Secretariat, Steering Committee, other Working Groups, etc.)</b>	
<p>At the full VEGNET meeting in Olomouc in 2007 the WG members agreed unanimously that all future VEGNET reports will be published electronically. The VEGNET NCG has not included a cost in the proposed Phase VIII budget for printed publications and so we look to the Secretariat to maintain a level of service for editing and compilation for on-line publications and such costs will be covered within the Secretariat.</p>	
<b>c. External resources needed (collaboration, external funding)</b>	
<p>In the development of a European cryopreservation collection of garlic, and subsequently shallot, there will be a requirement for an injection of funds to support temporary skilled staff to meet the peak of technical work in the transfer of plant material in the field through meristem culture [desirable] &amp; cryo-explant preparation [essential] into cryopreservation. Whether such temporary funding can be met from national programme budgets or other external funding sources is an open question.</p>	