

IWYP ALIGNED PROJECTS

Summary

The International Wheat Yield Partnership (IWYP) is working towards a goal to increase the genetic yield potential of wheat by up to 50% in the next 20 years. We aim to accomplish this by improving the photosynthetic capability of the wheat plant and the amount of captured carbon that is sent to the developing grain. By developing a Scientific Program that combines fundamental research with applied science we aim to generate knowledge and ultimately superior wheat lines that will be readily taken up by wheat breeding programs around the world.

It is anticipated that the genetic yield potential of wheat can be enhanced by:

- 🌱 Increasing carbon capture before flowering
- 🌱 Overall optimizing photosynthetic efficiency and carbon mobilization
- 🌱 Optimizing plant architecture and modifying phenology
- 🌱 Increasing biomass
- 🌱 Optimizing harvest index

These are the target areas that fall within the research scope of IWYP. At this time, we are not interested in aligning with research projects that focus primarily on other areas such as plant stresses or agronomic systems.

If you are interested in becoming an IWYP Aligned Project, please complete and submit the Proforma application available from our website <http://iwyp.org/aligned-projects/>. If you require further information or have any questions on IWYP please see <http://iwyp.org> or contact the IWYP Program Director at [iwypdirector@iwyp.org](mailto:iwypprogdirector@iwyp.org) or the IWYP Program Manager at [iwypmanager@iwyp.org](mailto:iwypprogmanager@iwyp.org).

Background

One of the key principles behind the IWYP model is the use of flexible approaches to deliver IWYP's research goals. From its inception, IWYP has recognized that many scientifically excellent projects that are within the IWYP research scope that focus on elevating wheat yield potential are already in place around the world and would therefore be mutual benefit to formally draw these into IWYP as "IWYP Aligned Projects". It is anticipated that such an alignment would offer added value to both IWYP and the research projects that become Aligned Projects.

Benefits of becoming an Aligned Project

- Furthering your own research goals and the goals of IWYP by exchanging information and knowledge from projects currently in progress;
- Access to a globally connected network of scientists working in the same research area of yield potential and increased leverage for supporting future generations of wheat researchers;
- Both IWYP and Aligned Project partners gain considerable knowledge and commitment from each other;
- The body of knowledge and emerging results for yield potential can be presented collectively to academic groups, industrial partners and funding agencies;
- Increase the rate of progress in your own research by sharing results and knowledge;
- Having a voice in shaping the research priorities of IWYP;
- Avoid duplication of effort by more cost-effective use of resources;
- Be notified early of Calls for IWYP grants and be better positioned to submit applications that build on existing projects to directly support IWYP's goals;
- Eligible for no cost access to the IWYP Hub at CIMMYT for germplasm, traits, and tools emerging from Aligned Projects in order to validate discoveries and enter the prebreeding pipeline. This will be on the same terms as funded projects (subject to a quality/relevance/priority gateway check against agreed criteria);
- Access to a well-defined pathway for deployment of output into a breeding program and improved varieties thus promoting the value of your research project to your institute and/or funder(s);
- Financial support can be provided in the form of travel "mini-grants" to enable participation in the annual IWYP Program Conference, interact directly with IWYP funded projects and scientists and share results; and
- Where it is of benefit to IWYP to do so, modest financial assistance, on a case-by-case basis, to support research activities of an Aligned Project.

IWYP Research Scope

The Research Areas chosen are designed to be transformational and high risk, commensurate with the very challenging IWYP goal and the fact that current breeding programs, neither public nor private, have a sufficiently high rate of yield gain to satisfy projected future global food needs. Past major increases in the genetic yield potential of wheat have largely resulted from improvements in harvest index rather than increased biomass. Further large increases in harvest index are unlikely, but an opportunity exists for increasing both productive biomass and harvestable grain. It is widely accepted that a major limitation to increasing the genetic yield potential of wheat relates to the amount of carbon fixed via the canopy before flowering. Thus a central theme to IWYP research is discovering ways to generate more biomass resulting from more efficient carbon capture and conversion, followed by optimization of plant development to ensure as much as possible of the additional captured carbon is translated to harvested grain.

It is expected that much of IWYP sponsored research will focus on photosynthesis, carbon deposition and growth rate within an ideotype suitable for commercial agriculture. If examples of enhanced biomass before flowering have already been achieved, then research seeking to evaluate the gains in seed yield or to translate the additional carbon into grain yield via optimising harvest index will be welcome.

- 🌱 Discovery of genetic variation in wheat that boosts the fixation of carbon into biomass for subsequent transfer to grains
- 🌱 Deployment of proven genes to boost carbon fixation and biomass production
- 🌱 Maximizing grain yields from enhanced carbon capture and biomass through optimizing plant phenology
- 🌱 Building elite lines for dispersal to other breeding programs
- 🌱 Taking advantage of discoveries coming from relatives of wheat and other species
- 🌱 Breakthrough enabling technologies to transform wheat breeding.

For more detail on IWYP core research themes, see <http://iwyp.org/research-scope-areas/>

The IWYP Hub at CIMMYT will carry the major responsibility for advanced field validation and building the innovations into elite adapted germplasm for distribution, with the required supporting breeding tools, to public and private programs through its existing worldwide networks and collaborations. It will employ high throughput phenotyping and marker assisted breeding technologies.

IWYP Aligned Projects Requisites

The following general principles listed below should be considered and agreed to by the researchers and their institutions in order to be approved as an IWYP Aligned Project.

- 🌱 Share methods, data, information and outputs with other researchers in the IWYP program, for the greater good of achieving wheat yield increases;
- 🌱 Be open and willing to join an IWYP steering group / committee if requested;
- 🌱 Agree that any discoveries and associated project IP will be available nonexclusively on a fair and equitable basis via licenses or MTAs and on a royalty free basis to resource poor farmers;
- 🌱 Should be willing to move successful discoveries, when promoted by the Program Director, to further validation and prebreeding at the IWYP Hub, towards release of elite germplasm to breeding programs worldwide;
- 🌱 If transgenes and / or transgenic plants are the key project deliverables, describe any plans for commercialization, including any known barriers to deployment;
- 🌱 If the use of transgenic technology is part of your project, provide a short summary outlining biosafety and stewardship considerations;
- 🌱 Attend and present research findings at IWYP meetings and share with IWYP management a summarized research (executive summary and research highlights) report on an annual basis;
- 🌱 Acknowledge IWYP in research publications, presentations, posters, proceedings etc., where appropriate.