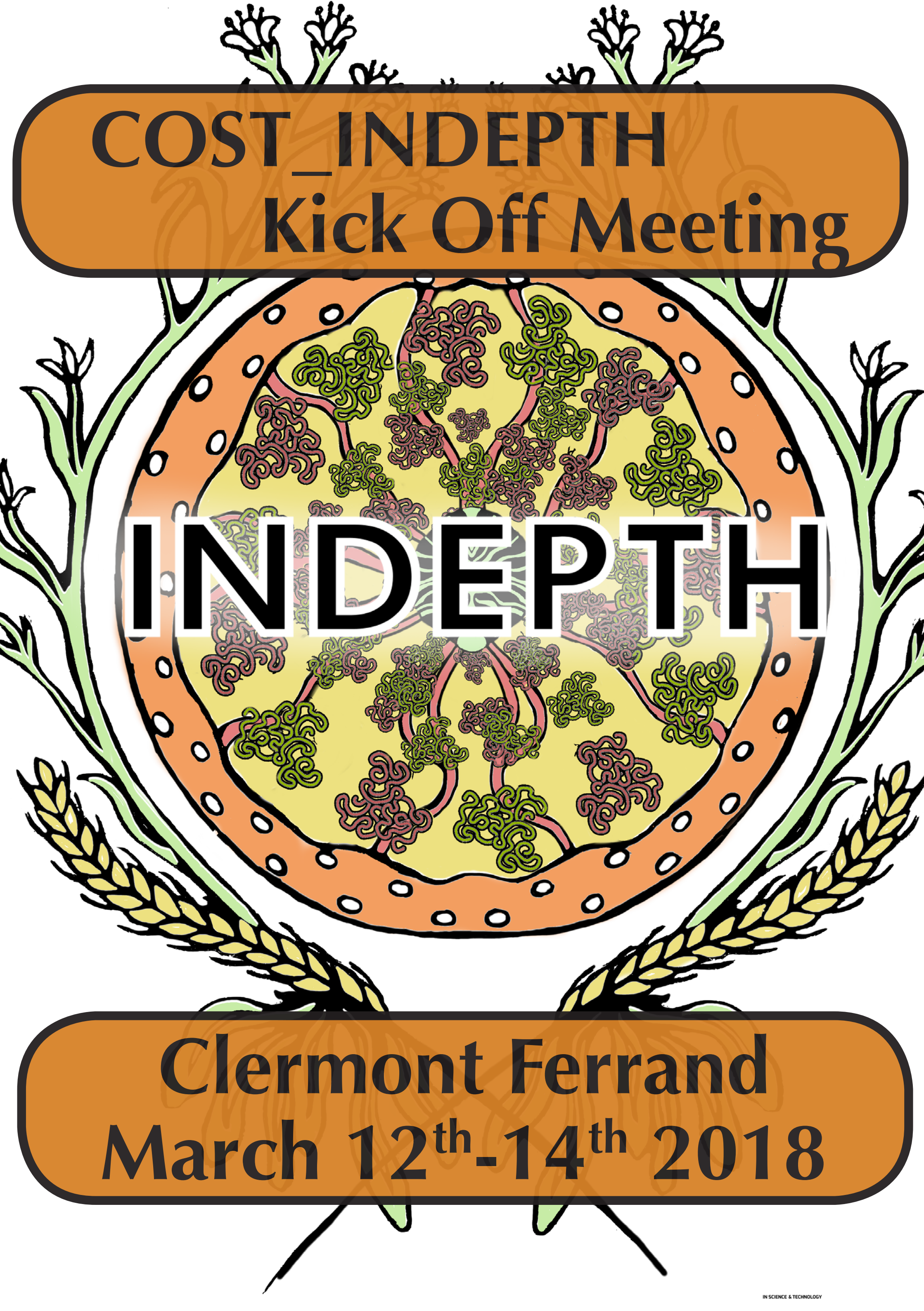
COST_INDEPTH
Kick Off Meeting
INDEPTH
Clermont Ferrand
March 12th-14th 2018
IN SCIENCE & TECHNOLOGY

COST_INDEPTH Kickoff Meeting

Poster WG3.2

NEW BREEDING EFFORTS FOR CLIMATE SMART OIL CROPS

Sandra Cvejic, Siniša Jocic, Dragana Miladinovic, Ana Marjanovic Jeromela, Milan Jockovic, Aleksandra Dimitrijevic, Sreten Terzic, Boško Dedic, Vladimir Miklic

Institute of Field and Vegetable Crops, Novi Sad, Serbia

sandra.cvejic@fvcns.ns.ac.rs

The total production of oil crops has strongly increased over the past 30 years due to a steadily growing demand in food, feed and non-food uses (e.g. biofuel) of vegetable oils and their by-products. To cope with the impact of climate change, current breeding efforts worldwide are focused on sustainable production and higher oil yield per unit area of land with a view to increase tolerance to biotic and abiotic stress. The Institute of Field and Vegetable Crops (IFVCNS), from Novi Sad, Serbia has long tradition in breeding and production of major oil crops, such as sunflower and rapeseed.

In the light of climate changes sunflower is one of the higher adaptation crops due to deep roots prevent erosion and allow drought and other unsuitable conditions to be survived. Therefore, breeding for biotic and abiotic stress tolerance proved to be the most economic and environmental friendly method. Breeding strategies at IFVCNS related to rapeseed are based upon the basic research of seed yield components and seed yield and quality. However, there is a need to develop new varieties which are more efficient in exploiting water, energy, and fertilizer to improve and increase its adaption capability under different environmental conditions and get improved and sustainable yields.

Beside sunflower and rapeseed numerous other plant species are also regarded as a possible oil source and various adaptability potentials, such as castor oil plant, safflower, flax, mustard, false flax, sesame, caper spurge, mary thistle and oil pumpkin.

This study was supported by Ministry of Education, Science and Technological Development of Republic of Serbia, project TR31025, Provincial Secretariat for Higher Education and Science of Vojvodina, project 114-451-2126/2016-03, and COST Action CA 16212.

Jocic, S., Miladinovic, D., Kaya, Y. (2015). Breeding and genetics of sunflower. In: Martinez Force, E., Turgut Dunford, N., Salas, J.J. (eds.), Sunflower: Chemistry, Production, Processing and Utilization, AOCS Press, Urbana, Illinois, USA, 710, 1-26.
Marjanovic Jeromela, A., Terzic, S., Zoric, M., Marinkovic, R., Atlagic, J., Mitrovic, P., Milovac, Ž. (2011). Evaluation of seed and oil yield stability in NS rapeseed cultivars (Brassica napus L.). Ratar. Povrt., 48: 67-76.

Poster WG3.3

DISSECTION OF GENOMIC ARCHITECTURE OF COMPLEX TRAITS AND THEIR PHENOTYPIC PLASTICITY IN TETRAPLOID WHEAT UNDER DROUGHT STRESS

Andrii Fathiukha[1], Mathieu Deblieck[2], Lianne Merchuk[3], Zvi Peleg[3], Frank Ordon[2], Yehoshua Saranga[3], Abraham Korol[1], Tzion Fahima[1], Tamar Krugman[1]

1- Institute of Evolution and Department of Evolutionary and Environmental Biology, University of Haifa, Mt. Carmel, Haifa 31905, Israel.
2- The Robert H. Smith Institute of Plant Science and Genetics in Agriculture, the Hebrew University of Jerusalem, Rehovot 76100, Israel.
3- Julius Kühn-Institut (JKI) Federal Research Centre for Cultivated Plants, Institute for Resistance Research and Stress Tolerance, Erwin-Baur-Str. 27, 06484 Quedlinburg, Germany

tkrugman@univ.haifa.ac.il

Phenotypic plasticity is considered one of the major means by which plants adapt to environmental stresses. Adaptive to drought acquired by crop wild relatives can be used for crop improvement. Wild emmer wheat (WEW), Triticum dicoccoides, the progenitor of domesticated wheat, is an important source for wheat improvement. We used high density genetic map derived from T. durum (cv. Langdon) crossed with WEW (G18-16) for QTL mapping of 17 complex traits, including yield, morphology, phenology, biomass and four physiological traits associated with drought response, measured in two water regimes. Residuals of regression between values of traits in control and stress conditions were used as derivative traits for QTL mapping of plasticity in response to drought stress. A total of 33 out of 78 QTLs were identified with plasticity effect on at least one trait. Five QTLs were identified for plasticity traits only, and for nine QTLs we identified effects on plasticity traits without significant effects on the corresponding initial traits. Twelve QTLs affected plastic-yield related traits.

The QTL7B.1, with WEW favorable allele, had major plastic effects on yield related traits and phenology. Based on WEW sequence (1) we suggest Vrn-B3 as candidate gene for QTL7B.1. Our results shed light on the genetic architecture of wheat plasticity in response to water stress and confirmed the importance of taking into account variation of phenology in the genetic analysis of plant adaptation. Genetic diversity of WEW allows us to identify new QTLs that can be used for improving drought tolerance of wheat cultivars.