

Sonja SILJAK-YAKOVLEV, Director of Research CNRS emeritus

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CV:

Education:

1986 - Ph.D. in Plant Evolutional Systematic, Faculty of Sciences, University of Paris-Sud, France

Career/Employment

1971-76 Researcher, Institute of Biology, Faculty of Biology, University of Sarajevo, Bosnia and Herzegovina

1977-78 Assistant in Biology, University Paris-Sud, Faculty of Sciences, Orsay, France

1979-92 Researcher, CNRS, Laboratory of plant biology, University of Paris-Sud, Orsay, France

1992-2014 Director of research CNRS, Laboratory Ecology, Systematic and Evolution, Department of Biodiversity, Systematic and Ecology, UMR CNRS 8079, University Paris-Sud, France

2014 - present Director of research CNRS emeritus, Laboratory Ecology, Systematic and Evolution, UMR CNRS 8079, University Paris-Sud, France

Main Research field: Chromosome evolution and genome organization, Cytogenetic and evolution of plants; Biodiversity; Endemism, Plant Evolutional Systematic

Teaching:

I deliver lectures and courses in cytogenetic, karyosystematic and palynology (e.g., a lecture entitled "Genome organization and evolution" with particular focuses in genome size evolution. (Master level at University Pierre et Marie Curie Paris VI, University of Sarajevo (Bosnia), University of Belgrade (Serbia) and University St-Joseph of Beirut (Lebanon).

Research fields:

My research focuses on the evolution of species complexes by cytogenetic approaches at several levels of integration: chromosomal, nuclear, cellular, individual, populational and specific. These researches find application in various disciplines of biology (eg. evolutionary systematics, genetics or biodiversity) through studies of the evolution of genome size and chromosome number, the molecular structure of chromosomes, the heterochromatin and repeated sequences in general, and the organization of ribosomal genes.

In our wide project "*Towards a genome size and chromosome number database of Balkan flora*" numerous genera were studied. During this study the genome size assessment permitted to point out, in several species complexes, the existence of different ploidy levels, hybridisation processes, dysploidy phenomenon or presence of B chromosomes. Our observations underline the necessity of multiple sampling, notably to handle the very real possibility of different ploidy levels in the same population. Investigation of several populations for one species is also very useful, leading to the discovery of different ploidy levels among populations. A similar project on the flora of Lebanon is also in progress with my colleagues at the University St Joseph in Beirut.

I am also engaged in the field of biodiversity assessment and strategy for its preservation. So, with my colleagues at the University of Sarajevo I initiated a program on biodiversity assessment and measures for the conservation of rare or endemic species which flora of Bosnia and Herzegovina is very rich.

Research projects:

Through my collaboration with colleagues from Mediterranean countries (Algeria, Croatia, France, Greece, Italy, Lebanon, Montenegro, Spain, Tunisia) the program about genome size database will be expanded to a large part of the Mediterranean basin. The evolution of genome size will be studied in several plant genera. This project is in close collaboration with Spencer Brown and Mick Bourge (Institut des Sciences du Végétal, UPR 2355, CNRS, Gif-sur-Yvette, France), Joan Vallès (Faculty of Pharmacia, University of Barcelona), Teresa Garnatje and Sonia Garcia (Institute of Botany, Barcelona) and Oriane Hidalgo and Jaume Pellicer (Royal Botanical Garden, Kew).

Scientific production:

- 203 articles
- 6 book chapters.
- 303 contributions to scientific congresses

Selected publications from 5 last years:

- Bareka P., Siljak-Yakovlev S., Kamari G. 2012. Molecular cytogenetics of *Bellevalia* (Hyacinthaceae) species occurring in Greece. *Plant Syst. Evol.* 298 (2): 421-430.
- Sánchez-Jiménez I., Hidalgo O., Ángel Canela M., Siljak-Yakovlev S., Edita Šolić M., Vallès J., Garnatje T. 2012. Genome size and chromosome number of *Echinops* (Asteraceae, Cardueae) in the Aegean and Balkan regions: technical aspects of nuclear DNA amount assessment and genome evolution in a phylogenetic frame. *Plant Systematic and Evolution*, 298: 1085-1099.
- Olinda Tacuatiá L., Souza-Chies T., Eggers L., Siljak-Yakovlev S., Rosa F C. Kaltchuk-Santos E. 2012. Cytogenetic and molecular characterization of morphologically variable *Sisyrinchium micranthum* (Iridaceae) in southern Brazil. *Botanical Journal of the Linnean Society*, 169, 350–364.
- Siljak-Yakovlev S. and Peruzzi L. 2012. Cytogenetic characterization of the endemics: past and future. *Plant Biosystems* 146 (3): 694–702.
- Karrat-Souissi A., Siljak-Yakovlev S., Pustahija F., Chaib M. 2012. Physical mapping of the 5S and 18S-5.8S-26S rRNA genes in polyploid series of *Cenchrus ciliaris* L. *Comparative Cytogenetics*, 6(3): 273–286.
- Garnatje T., Hidalgo O., Vitales D., Pellicer J., Valles J. Robin O., Garcia S., Siljak-Yakovlev S. 2012. Swarm of terminal 35S in *Cheirolophus* (Asteraceae, Centaureinae). *Genome*, 55 (7): 529-535.
- Niketic M., Siljak-Yakovlev S., Frajman B., Lazarevic M., Stevanovic B., Tomovic G., Stevanovic V. 2013. Towards resolving the systematics of *Cerastium* subsect. *Cerastium* (Caryophyllaceae): a cytogenetic approach. *Bot. Jour. Linn. Soc.*, 172: 205–224.
- Bou Dagher-Kharrat M., Abdel-Samad N., Douaihy B.C., Abdel-Samad F., Bourge M., Siljak-Yakovlev S., Brown S. 2013. Nuclear DNA C-values for biodiversity screening: Case of the Lebanese flora. *Plant biosystems*, 147 (4): 1228-1237
- Karrat-Souissi A., Siljak-Yakovlev S., Brown S.C, Chaib M. 2012. Is hexaploid *Cenchrus ciliaris* more appropriate for restoration of degraded North African ecosystem? *Folia Geobotanica*, 48: 95–113
- Garcia S., Hidalgo O., Jakovljević I., Siljak-Yakovlev S., Vigo J., Garnatje T., Vallès V. 2013. New data on genome size in 128 Asteraceae species and subspecies, with first assessments for 39 genera, three tribes and two subfamilies. *Plant biosystems*, 147 (4): 1219–1227.
- Pustahija F., Bogunic F., Basic N., Muratovic E., Bourge M., Brown C.S. Stevanović V., Siljak-Yakovlev S. 2013. Small genomes dominate in plants growing on serpentine soils in West Balkans, an exhaustive study of 8 habitats covering 308 taxa. *Plant and soil*, 373:427–453
- Siljak-Yakovlev S., Temunovic M., Robin O., Raquin Ch., Frascaria-Lacoste N. 2013. Genome size and physical mapping of rDNA and G-C rich heterochromatin in three European *Fraxinus* species. *Tree genetics & genomes*, 10: 231-239.
- Lazarević M., Siljak-Yakovlev S., Lazarević P., Stevanović P., Stevanovic V. 2013. Pollen and seed morphology of resurrection plants from the genus *Ramonda* (Gesneriaceae): relationship with ploidy level and ecology. *Turkish Journal of Botany*, 37: 872-885.
- Abdel Samad F., Baumel A., Juin M., Siljak-Yakovlev S., Médail F., Bou Dagher Kharrat M. 2013. Genome size and polyploidy evolution of endemic Lebanese *Astragalus* in phylogenetic tramwork. *Plant Systematic&Evolution*, 300: 819-830.
- Vallès J., Canela M.Á., Garcia S., Hidalgo O., Pellicer J., Sánchez-Jiménez I., Siljak-Yakovlev S., Vitales D., Garnatje T. 2013. Genome size variation and evolution in the family Asteraceae. *Caryologia*, 66: 236-242.
- Benhizia H., Benhizia Y., Ghernoub L., Siljak-Yakovlev S., Khalfallah N. 2013. Meiotic behavior and karyotype feature of endangered endemic fodder species *Hedysarum perrauderianum* Coss. (Fabaceae) in contrasted environmental conditions. *Caryologia*, 66: 195-204.
- Karrat-Souissi A., Siljak-Yakovlev S., Brown S., Baumel A., Torre F., Chaib M. 2014. The polyploidy nature of *Cenchrus ciliaris* L. (*Poaceae*) has been overlooked: new insights for the conservation and invasion biology of this species - A review. *The Rangeland Journal*, 36: 11-23.
- Rakić T., Lazarevic M., Jovanovic ZS, Radovic S., Siljak-Yakovlev S., Stevanović B., Stevanović V. 2014. Resurrection plants of the genus *Ramonda*: prospective survival strategies – unlock further capacity of adaptation, or embark on the path of evolution? *Frontiers in Plant Sciences*, 4: 550, 1-9.

- Kit Tan, Biel B., Siljak-Yakovlev S. 2014. *Galanthus samothracicus* (Amaryllidaceae) from the island of Samothraki, northeastern Greece. *Phytologia Balcanica*, 20(1): 13-18.
- Valles J, Bašić N, Bogunić F, Bourge M, Brown Cs, Garnatje T, Hajrudinović A, Muratović E, Pustahija F, Šolić ME & Siljak-Yakovlev S. 2014. Contribution to plant genome size knowledge: first assessments in five genera and 30 species of angiosperms from western Balkans. *Botanica Serbica*, 38 (1): 3-11
- Fridlender A, Pustahija F, Solic ME, Abadzic S, Bourge M, Pech N, Siljak-Yakovlev S, Brown SC. 2014. Is it possible to identify *Colchicum neapolitanum* s.l. and *C. autumnale* s.l. in vegetative stage? Biometry and flow cytometry approaches. *Botanica Serbica*, 38 (1): 21-34
- Baziz K, Benamara-Bellagha M, Pustahija F, Brown CS, Siljak-Yakovlev S, Khalfallah N. 2014. First karyotype analysis, physical rDNA mapping and genome size assessment in four North African *Astragalus* taxa (Fabaceae). *Turkish Journal of Botany*, 38: 1248-1258
- Rakić T., Siljak-Yakovlev S., Šinžar-Sekulić J., Lazarevic M., Stevanović B., Stevanović V., Lakušić D. 2014. Morphological and genome size variation within populations of *Edraianthus graminifolius* „jugoslavicus” (*Campanulaceae*) from the Central Balkan Peninsula. *Arch. Biol. Sci., Belgrade*, 66 (2): 743-763.
- Moraes AP., Souza-Chies T., Stiehl-Alves EM., Piccolli P., Eggers L., Siljak-Yakovlev S., Brown S.C., Chauveau O., Nadot S., Bourge M., Kaltchuk dos Santos E., 2015. Evolutionary trends in Iridaceae: new cytogenetic findings from the New World. *Bot. Jour. Linn. Soc.*, 177: 27-49.
- Enke N., Reinhard K, Fatima P, Gernot G, Jonas Z, Jana O, Georgia K, Siljak-Yakovlev S. 2015. Phylogeny and Karyotype Evolution in *Crepis* section *Neglectoides*. *Plant Biology*, 17: 775–786.
- Vallès J, Garnatje T, Robin O, Siljak-Yakovlev S. 2015. Molecular cytogenetic studies in western Mediterranean *Juniperus* (Cupressaceae): a constant model of GC-rich chromosomal regions and rDNA loci with evidences for paleopolyploidy. *Tree Genetics & Genomes* (in press)
- Hajrudinovic A., Frajman B., Schönswetter P., Silajdzic E., Siljak-Yakovlev S., Bogunic F. 2015. Origin, characterisation and description of a new, geographically isolated, tetraploid apomictic *Sorbus* species (Rosaceae) from Bosnia and Herzegovina (Balkan Peninsula). *Bot. Jour. Linn. Soc.*, 178 (4): 670–685
- Hajrudinovic A., Siljak-Yakovlev S., Brown SC, Pustahija F., Bourge M., Ballian D., Bogunic F. 2015. When sexual meets apomict – genome size, ploidy level and reproduction mode variation of *Sorbus aria* s.l. and *S. austriaca* (Rosaceae) in Bosnia and Herzegovina. *Annals of Botany*, 116 (2): 301-312
- Fyad-Lameche F-Z., Iantcheva A., Siljak-Yakovlev S., Brown S. C. 2015. Chromosome number, genome size, seed storage protein profile and competence for direct somatic embryo formation in Algerian annual *Medicago* species. *Plant Cell, Tissue & Organ Culture (PCTOC)*, 124(3):531–540
- Conti F., Niketić M., Vukojičić S., Siljak-Yakovlev S., Barina Z. & Lakušić D. 2015. A new species of *Reichardia* (Asteraceae) from Albania and re-evaluation of *R. macrophylla*. *Phytotaxa*, 236(2): 121–134
- Boukhenane M., Khalfallah N., Pustahija F., Siljak-Yakovlev S. 2015. Cytogenetic characterization of six populations of *Narcissus tazetta* L. (Amaryllidaceae) from western Mediterranean. *International Journal of Advanced Research*, 3(11): 1538 -1546
- Gemma Mas de Xaxars, Garnatje T., Pellicer J., Sonja Siljak-Yakovlev S., Vallès J., Garcia S. 2016. Impact of dysploidy and polyploidy in high mountain *Artemisia* (Asteraceae) and allies. *Alpine Botany*, 126(1), 35-48.
- Bationo-Kando P., Zongo JD, Siljak-Yakovlev S. 2016. First genome size assessment, heterochromatin and rDNA chromosome mapping in the genus *Sclerocarya* (Anacardiaceae): case study of *Sclerocarya birrea* subsp *birrea*. *Botany Letters*, 163(1): 11-17.
- Tacuatiá L., Kaltchuk-Santos E., Teixeira Souza-Chies T., Eggers L., Robin O., Pustahija F., Raquin C., Siljak-Yakovlev S. 2016. Physical mapping of rRNA genes and genome size variation in polyploid series of *Sisyrinchium micranthum* and its closely related species *S. laxum* and *S. rosulatum*. *Plant Biosystems*, DOI: 10.1080/11263504.2016.1179691
- Benamara-Bellagha M, Baziz K, Pustahija F, Khalfallah N, Siljak-Yakovlev S. 2016. Cytogenetic characterization and nuclear DNA content of three North African endemic *Centaurea* species. *Plant Biosystems*, 150 (3): 501-511.
- Lakusic D., Stefanovic S., Siljak-Yakovlev S., Rakic T., Kuzmanovic N., Surina B. 2016. *Edraianthus stankovicii* (Campanulaceae), an overlooked taxon from the Balkan Peninsula - Evidence from morphometric, molecular and genome size studies. *Phytotaxa*, 269(2):69-89.
- Abdel Samad N., Bou Dagher-Karrat M., Douaihy B., El Zein R., Hidalgo O., Siljak-Yakovlev S. 2016. Unlocking the karyological and cytogenetic diversity of *Iris* from Lebanon: *Oncocyclus* section

shows a distinctive profile and relative stasis during its continental radiation. PLoS ONE 11(8): e0160816. doi:10.1371/journal.pone.0160816

Hidalgo O., Viales D., Vallès J., Garnatje T., Siljak-Yakovlev S., Leitch I., Pellicer J. 2017. Cytogenetic insights into an oceanic island radiation: the dramatic evolution of preexisting traits in *Cheirolophus* (Asteraceae, Cardueae-Centaureinae). *Taxon*, 66(1): 146-157.

Carev I., Ruščić M., Skočibušić M., Maravić A., Siljak-Yakovlev S., Politeo O. 2017. Phytochemical and cytogenetic characterization of *Centaurea solstitialis* (Asteraceae) from Croatia. *Chemistry & Biodiversity* DOI: 10.1002/cbdv.201600213