



Vlaanderen
is wetenschap

INSTITUUT
NATUUR- EN BOSONDERZOEK

80 years of floristic research in Flanders:

From cartography to monitoring

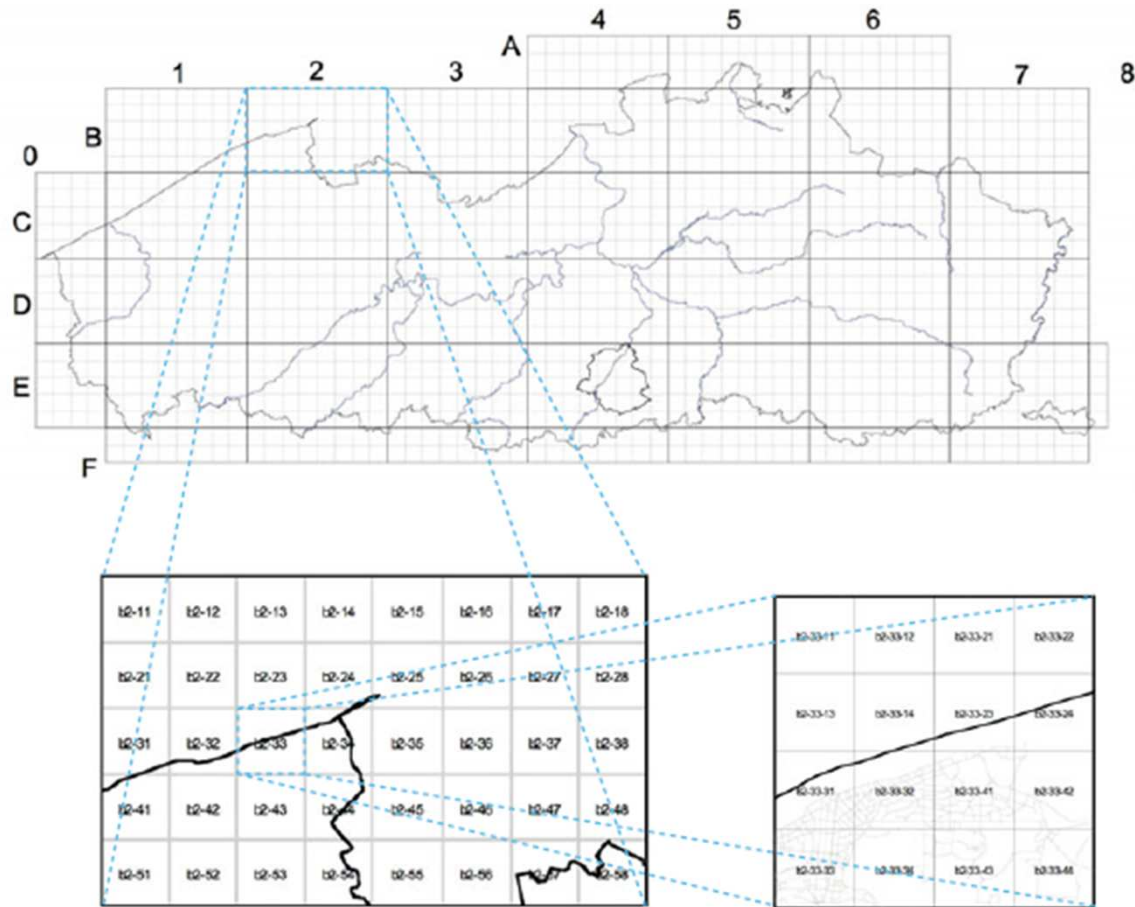
Wouter Van Landuyt

History of the cartography of the Flora of Flanders

- Systematic cartography of the flora of Belgium started in 1939 by the funding of the IFBL (Van Rompaey (1943). Cartes Floristiques)
- Use of 1km² grid over the whole territory of Belgium
- Checklists of all species
- No difference between rare and common plant species
- Only presence data (no quantitative measures)

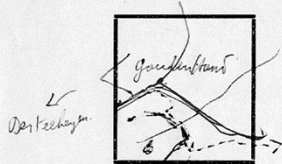


IFBL-raster



IFB flora checklist 1940

055073



Hokje: D3 14 H3
 Case
 door: L. Delvosalle
 par
 datums: 23/6/1955
 dates

Acer. c.pl.Ps. Aceras. Ach.n.p. Acon.N.v. Acor. Act. Adon.ae.auf. Adox. Ego.
 Æth. Agrim.E(o). Agrio.a.c.j.l.p.r. Agrost. Agrosti.a.b.c.i.s.v. Aira.c.m.p.
 Aj.Ch.g.p.r. Alch.ar.v. Alech.ma.mi. Als. Allia. Alliu. ca.o.sph.u.(co). Allos.
 Aln.g.i. Alop.b.f.g.m.i. Als.t.ve.vi. Ath.h.o. Aly. Amar.a.r.v. Ambr.a. Ammi.m.
 Anmo.a. Ams.l. Anaca. Anag.a(ca.coe.ph).t. Anch.o. Androm. Androp.
 Anem.h.n.P.r. Ang. Antenn.d. Anthem.a.C. Anther.l.r. Anthos. Anthyl.v.(m).
 Antir.m.O. Api.g.in.r. Aq. Arabid. Arabis.h.p.T. Arct.L.m.n.t. Are. Ari.
 Armor. Arni. Arnos. Aph. Art.Abs.o.l.c.m. Arum. Asp. Aspa. Asperul.a.c.
 g.o. Aspid.c.F.m.(d).T. Aspl.A.g.R.s.T.v. Aster.Tri. Astrag.g. Athy. Atri.
 ch.s.(s).p.r(a). Afro. Av.f.pr.pu.str. Az.

Bald. Ballo. Barb.i.ve.vu. Bart. Bel. Berb.v. Bert. Beta.m. Betu.p.v. Bid.c.m.
 Bis. Bla. Ble. Bot. Brach.d.p.s. Brassica.ni. Brassicel. Bray. Bri.me.mi.
 Bro.ard.aru.c.e.h.p.r.ac.ram.se.st.t. Bru.l.v. Bryo.d. Bunias.o. Bunium.
 Bup.f.r.t. But. Bux.

Cak. Calama.a.e.l.n.va.vi. Calep. Calla. Calli.a.h.o.p.s.v. Callu. Calth. Came.
 f.sasi. Camp.Ce.g.pa.pe.rapides.Rapulus.ro.T. Cypse. Cardamine.a.f.h.i.pa.pr.
 Cardaminop. Cardu.f.n.t. Carex.ac.ar.bi.br.can.car.cy.Da.de.dia.dig.dio.dista.
 disti.divi.divu.el.er.ex.f.g.l.g.r. He.li.Horn.hu.la.lept.lepo.lev.lig.lim.mo.mu.n.CE.or.
 Pai. pal. panice. panicu. par. pau.se.pila.pr. Ps.pul.re.ri.ro.si.ste.stric.strig.to.tr.u.ve.
 vulg.v.p. Carl. Carp. Caru.c.v. Cas. Catab. Caud.d.l. Centaurea.Cal.ch.(cap).
 mo.n.Sc. Centaurium.p.u.v. Centr. Centu. Ceph.e.p.r. Ceras.f.f.b.f.g.p.s.te.
 Cerat.d.s. Cet. Chaen. Chaeref.A.s. Chaeroph.t. Cheir. Chel. Chen.li.Bon.
 g.h.mur.o.p.r.s.u.Vu. Chrysa.L.P.s. Chryso.a.o. Cich.l. Cicu. Cīrc.e.i.l.
 Cirs.ac.an.d.r.e.l.o. Clad. Clay. Cle.Vita. Coch.d.o. Coelo. Colch. Colu.
 Com. Coni. Conr. Conval. Convo.ffe.So. Cora. Coris. Corn.m.s. Coronop.
 Corrig.l. Coryd.cl.l.s. Cofyl. Coto.l. Cras.a.m.r. Crat.m.o. Cre.b.c.f.n.pa.tate.
 Cus.epil.epith.eu. Cyd. Cynod. Cynog.g.o. Cynos.c. Cype.fl.fu. Cys.

Dac. Daph.L.M. Dat.S. Dau. Deli. Delph.C. Den.b. Desch.c.f.s. Dia.A.cae.cart.d.
 Digital.a.l.p. Digital.f.s. Dipl.m.t. Dips.p.si. Do.pa. Drab.a.m.v. Dro.a.ir.

Echinod. Echinopsi. Echiu.v. Ela.A.he.Hy.t. Elis. Elym.a.e. Emp. Epil.a.c.i.Lam.
 m.o.pal.par.r.t. Epim. Epipa.a.l.p. Eran.h.l.m.g.a.s.v. Eran. Eric.c.t. Eri.g.a.e.
 Erio.g.l.p.v. Erod.c.m. Eryn.c.m. Erys.ch.h(STR.v). Eupa. Eupho.a.c.d.Es.ex.h.
 L.par.Peplu.pl.st.v. Euphr.g.n.o.s. Evo.e.

Fagu. Fest.aru.c.d(ard).g.h.l.op(are).s. Fila.a.ge(c.l).m.n.s. Fili.h.U. Foe. Frag.
 m.ve.vi. Fan. Frax.e. Fri. Fuman. Fumar.c.d.o.p.V.

Gag. a.l.sp. Gala. Galeop.a.d.l.s.f. Galin. Galiu.g.a.s.b.c.er.h.M.pal.si.sp.t.ve.
 Genista.a.g.pit. Genistel. Gent.a.ca.ci.cr.g.p. Ger.c.d.E.l.ma.mo.n.pa.ph.pr.pu.
 py.Rob.rot.sa.si. Geur.u. Glauc.f. Glauc. Glch. Glo. Gly.B.f.pl.pr. Gna.l.siu.
 Good. Gra. Gymnad.a.c.o. Gyp.m.

Hed. Helianthe.a.n.s. Helich. Helle.f.v. Helod. Hera. Herm. Hern.g.h. Hiera.auri.
 b.m.pa.Pila.pides.t.u.v. Hima. Hippocr. Hippoph. Hippu. Hir. Holc.f.t. Holo.
 Hon. Hor.ma.nu.s. Hot. Hm. Hydroch. Hydroco. Hyme. Hyo. Hype.ac.An.
 He.hi.hu.l.ma.mo.pe.pu. Hypo.g.m.r.

Ib. a. Illex. Illec. Imp.n.p. In.b.C.sa. Irb. Isoë.

+ glycin beclinata.

Hokje: D3 14 H3
 Case

Jasi. m. Junc.acuti.an.t.l.ca.comp.cong.f.a.fl.Ge.g.l.l.m.o.p.r.sq.su.tena.tenu. Juni.
Kick. E.s. Kn.a. Koel.a.c(gr.py).
Lac. p.sal.Sc.vir. Lami.l.am.G.h.m.p. Laps. Lathr.c.s. Lathy.Aph.hi.mo.nig.Nis.pa.
 pr.si(he.l).t.v. Leg.h.S. Lem.g.n.t. Leont.h.h.n. Leonu. Lepi.c.Dr.g.l.r.v. Lept.f.
 Leuco.a.v. Lig. Limod. Limof. Limos. Lina.a.C.m.v. Lino. Linu.ct. Lip. Lis.
 Lithos.ar.o. Lob.D. Lol.m.p.r.t. Lon.p.x. Lot.cor(m.ten). Lud. Lun.r. Luz.
 c.F.m.n.p.s. Lych.f. Lyci. Lycop.al.ann.cl.co(anc.Ch).t.S. Lycops. Lycopu.
 Lys.ne.n.p. Lyt.h.m.p.

Mai. Malach. Malax. Malu.c.s. Malv.A.m.n.p.s. Marru. Matr.C.i.m. Matte.
 Med.ar.f.lu.mi.sa. Melamp.a.p. Meland.a.n.r. Melic.c.n.u. Melil.albalt.o.
 Ment.gar.l.pu.ro. Meny. Mer.a.p. Mesp. Meu. Mib. Microc. Mile. Moehr.
 Moen. Mol. Mono. Mont.m.r. Mu.b. Myc. Myoso.a.co.l.m.sc(cae.p).si. Myosu.
 Myrica. Myrio.a.s.v.

Nai. m.mi. Nare.ps. Nardurus. Nardus. Nart. Nas. Neo. Nu. Nymph.e. Nympho.
Ob. pe.po. Od.s. CEna.c.o.fl.fl.L.pe.pi. CEno.b.m. Om. Onobr. Onon.N.s(a.l.pr).
 Onop. Ophi. Ophr.ap.arach.aran.m. Orch.c.i.lat.lax.mac.mas.mi.mo.pa.pu.si.u.
 Orig. Orl. Ornithop.p. Ornithop.p. Oroba.al.car.g.h.ma.mi.pi.pu.ram.rap.t.
 Ory. Os. Oxa.A.c.s. Oxy.

Pan. Gr. Pap.A.d.h.n. Parie.o.r. Paris. Parn. Past. Ped.p.s. Pep. Peta.h. Petro.s.
 Peu.ca.p. Pheg.c.D.p. Phl.a.B.p. Phr. Phylli. Phys.Al. Phyt.s(n). Picr.e.h. Pil.
 Pim.m.s. Piro.m.r. Piru. Plan.a.Co.maj.mar.me. Platant.b.c. Poa.f.b.Ch.co.a.
 pap.r.f. Pod.l. Polycn.n. Polygal.a.ca.co.s.v. Polygona.m.o.v. Polygonu.g.h.v.
 Bl.Cy.cu.d.h.min.mit.p.v. Polypod. Polys.a.lob.Lon. Pop.t. Pota.ac.al.col.com.
 cr.d.g.l.m.p.o.pec.per.po.pr.pu.t. Potens.h.ar.e.i.p.r.p.ru.st.su.v. Pri.e.v. Pru.
 au.f.M.Pa.se.sp. Pter. Puc.d.m. Puli.d.v. Pulm.a(t).m.of.

Qu. pu.R.f.s.

Rad. Ran.ar.aq.ar.au.Ba.bu.f.Fi.flac(ho).Flam.flu.he.Le.Lin.pl.rope.Sa.c. Raph.
 Res.ter.lu. Rham. Rynch.a.f. Rib.G.n.r. Rob. Ror.f.i.s. Ros.ag.ar.c.e.i.mi.
 pe.s.t.v(mo.po). Rubu.a.c.f.h.l.L.m.p.r.su.Sch.se.Sp.sub.sul.t.u.v. Rudb. Rum.
 Aca. Aclis.aq.co.cdm.mar.max.p.pal.sa.sc. Rup.m(r.s). Rus.

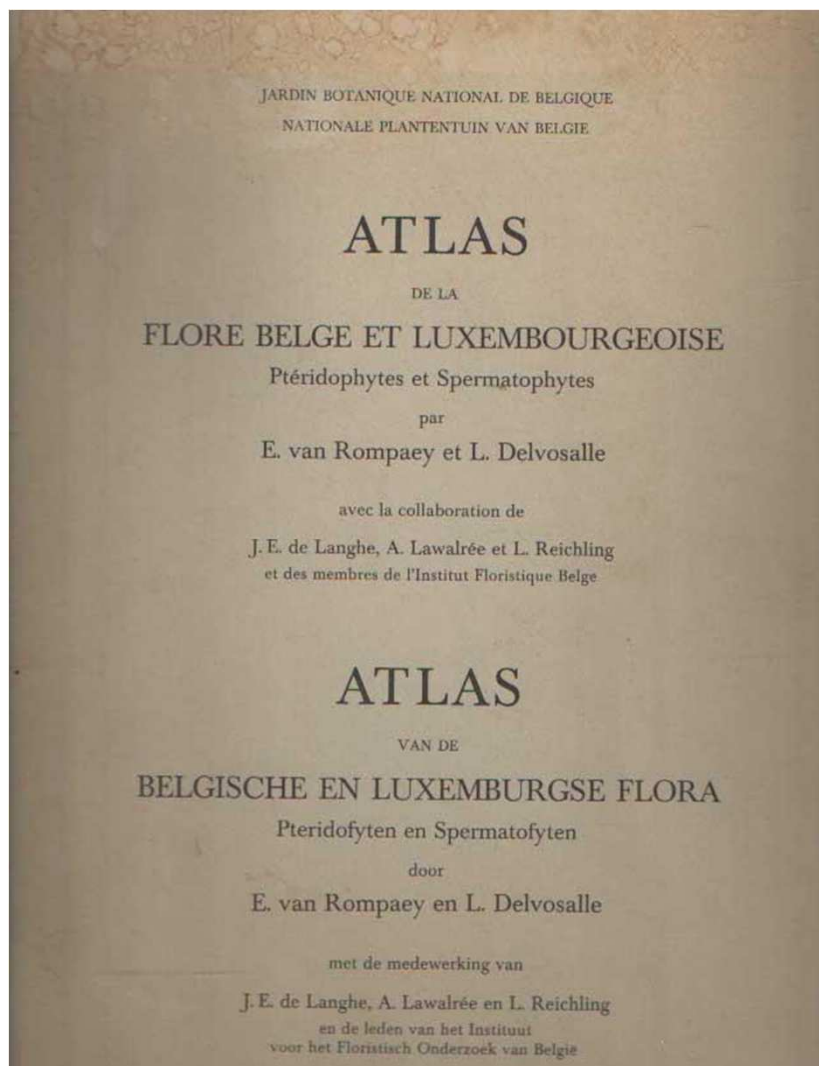
Sagin. d.c.m.n.p. Sagit. Salic. Sallx.a.l.au.ca.f.f.pe.pu.r.t.v. Sals.K(t). Salvia.p.vert.
 Samb.E.r.r. Samo. Sang.mi.o. Sani. Sap. Sar. Sat.A.C(me).v. Sax.d.g.h.r.t.
 Scab.c.p. Scan. Scheu. Schoenu.f.n. Scil.b.n. Scir.ac.cae.car.compr.f.H.l.
 na(coppa.mo).mul.o.pal.pau.se.si.Ta.tr.u. Sclera.a.p. Sclerop. Scorz.hu. Scro.
 ala.q.v. Scug.m. Sed.ac.al.e(vir).mit.re(g).T(p). Sela. Seli. Sem.m(F).t. Senec.
 a.eru.f.j.n.palud.palus.si.sp.vig. Ser. Sese.L.m. Sesi. Set.g.ve.vi. Sh. Sieg.
 Silaum. Silen.coni.g.in.n. Sin.g. Sisy.al.l.g.p(au).So. Siu.e.l. Solg.n. Soli.V.
 Son.ar.as.o.p. Sorb.Ar.auf. Sparg.m.i.s. Spart.s.T. Spergula.d.M.p. Spergularia.
 c.m.s. Spirae.st. Spiran.ae.au. Spig. Stach.al.an.ar.g.o.p.r.s. Stat.A(e.m).
 Stella.f.n.nem.p.v. Stea. Sta. Suae. Sub. Suc. Sympho. Symphy.o.

Tam. Tan. Tar.l.p.p. Tax. Tees. Teu.B.Ch.m.scord.Scoro. Tha.f.m. The.h.p.
 Thl.alp.ar.c.m.p. Thyme. Thymu.(Sa.Ch). Tili.c.p. Tori.An.ar.n. Trago.pr(m.o).
 Trien. Trif.ag.ar.c.f(d.m).fr.hy.ma.me.mo.o.pr.rep.sc.st.su. Trigl.m.p. Tris.f.
 Tub. Tul. Tun.g. Turri. Tus. Ty.a.l.m.

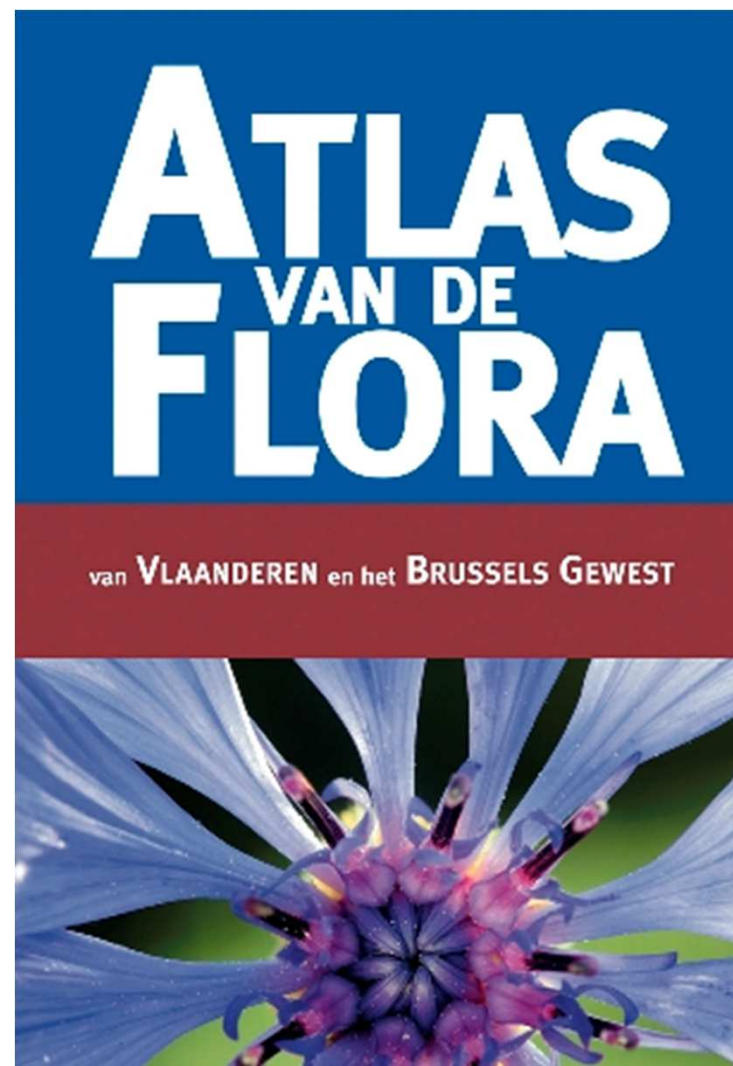
Ule. Ullm.c.e.m. Urr. Utr.B.i.m.n.v.

Vacca. Vacci.M.u.V. Valeriana.d.p. Valerianella.ca.de.o.r. Vent. Verba.Bia.L.n.
 ph.pu.thm. Thm. Verbe. Vero.ac.ag.An.lis.an.des.ar.B.Ch.h.l.m.of.op.pere.pers.po.
 prae.pro.scu.se.Teu.tr.v. Vib.L.O. Vic.C(Ge.ten).hi.la.sa(an).se.tet(gr).vi(va).
 Vinca.mi. Vincet.o. Vio.c.h.l.o.pa.pe.Ri.s.t(f.v). Visca. Visca. Vo. Vu.d.m.u.

Wahl. Wein. Wolf. Xan.sp.st. Zan.pa(g.pe). Zos.m.N.



1972 : Atlas de la Flore Belge et Luxembourgeoise



2006 : Atlas de la Flore de Flandre



Main results

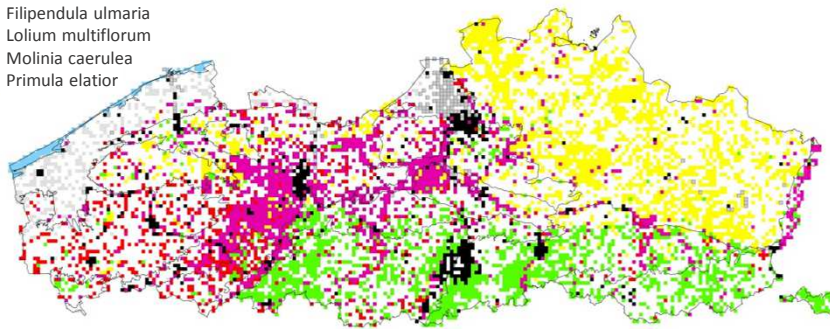
- Atlas de la Flore Belge et Luxembourgeoise, Pteridofytes et Spermatofytes (Van Rompaey & Delvosalle 1972)
- Atlas van de Flora van Vlaanderen en het Brussels Gewest (Van Landuyt et al. 2006)
- Datasets published on GBIF (www.gbif.org) as 'Florabank1' (data from 1972 onwards from Flanders) and as 'Belgian IFBL Flora Checklists' (data from Belgium for the periode 1939-1971)
- In total 5 million distribution data of vascular plants for Flanders available on the web.

The benefits of distribution maps

- Geographical coverage
- Analysis of distribution patterns.
- Spatial analyses of environmental changes.

Main distribution patterns

- *Ammophila arenaria*
- *Aster tripolium*
- *Budleija davidii*
- *Coronopus squamosus*
- *Euphorbia esula*
- *Filipendula ulmaria*
- *Lolium multiflorum*
- *Molinia caerulea*
- *Primula elatior*



Van Landuyt et al. 2011.

Landscape and Urban Planning.

<https://doi.org/10.1016/j.landurbplan.2010.08.020>

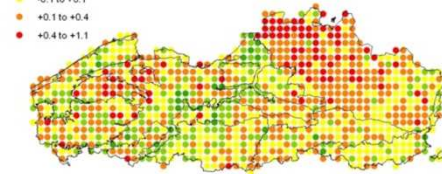
Mean N-indicator

- 3.8 - 5.0
- 5.0 - 5.4
- 5.4 - 5.6
- 5.6 - 6.0
- 6.0 - 6.5



Change Mean N-indicator

- -0.8 to -0.4
- -0.4 to -0.1
- -0.1 to +0.1
- +0.1 to +0.4
- +0.4 to +1.1



Van Landuyt et al. 2008.

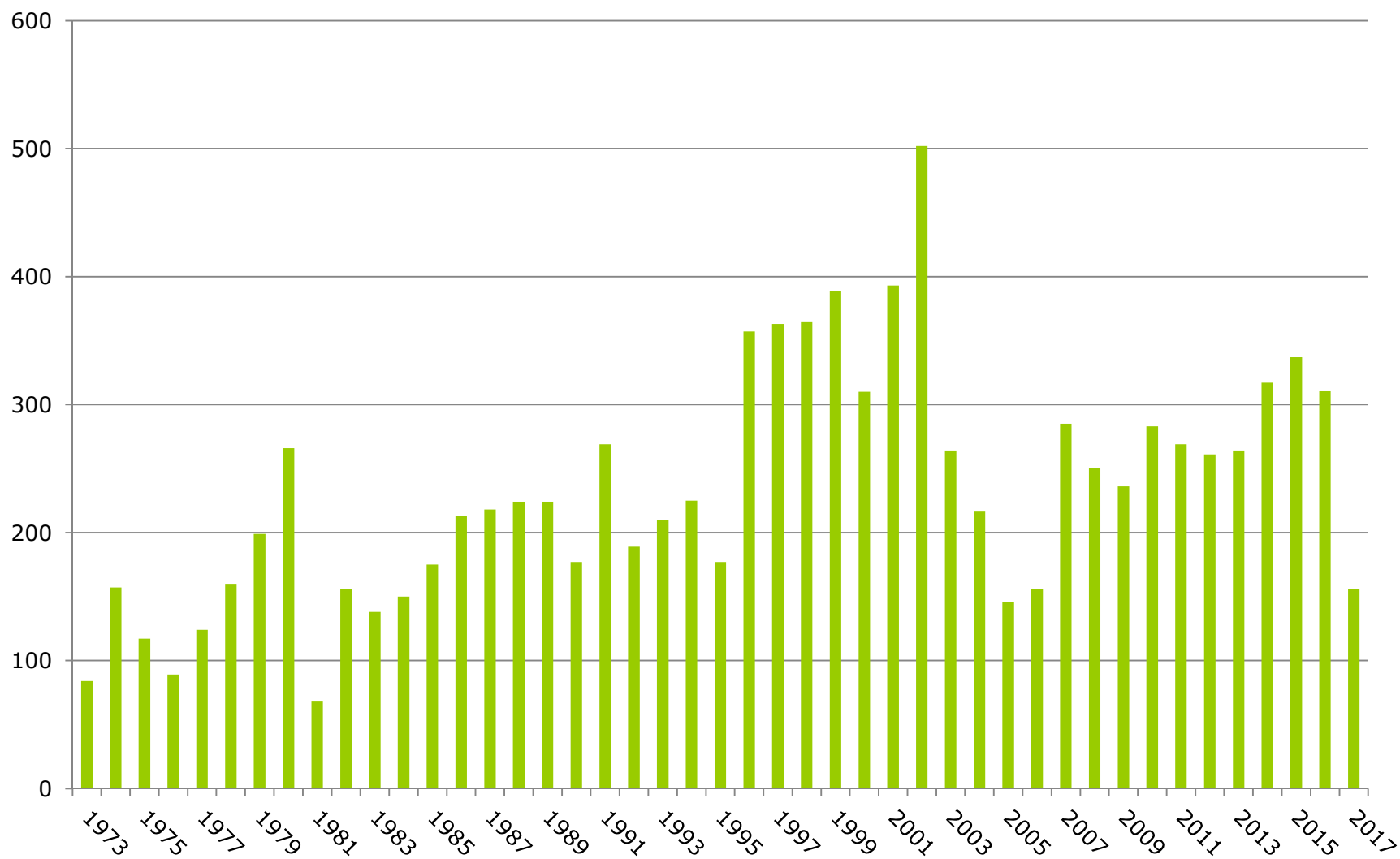
Biodiversity and Conservation.

doi: [10.1007/s10531-008-9415-3](https://doi.org/10.1007/s10531-008-9415-3)

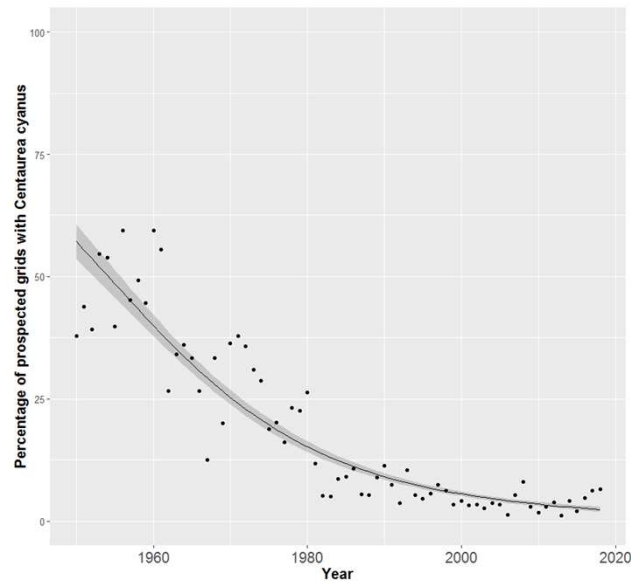
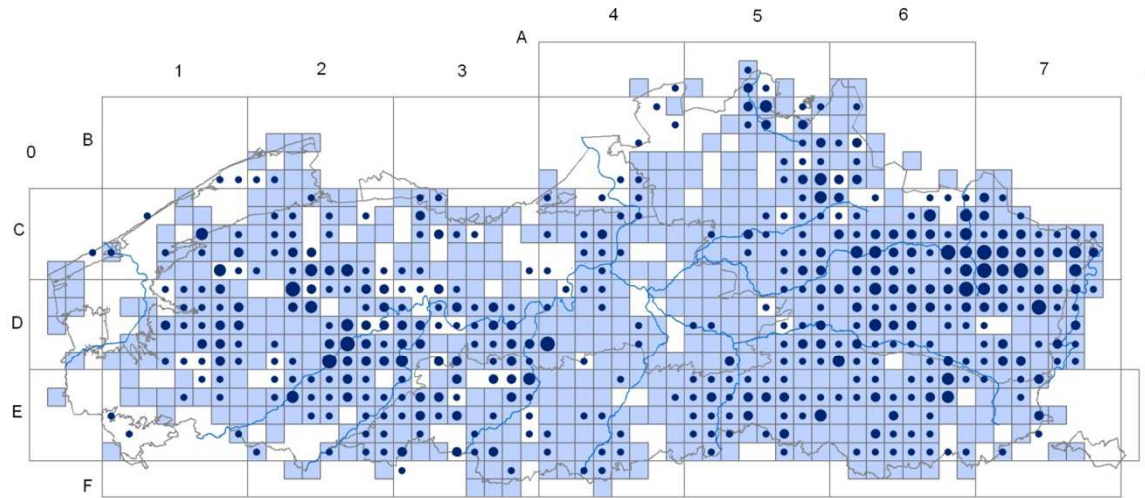
The problem with distribution maps

- Long period needed to produce maps covering the whole territory by amateur botanists.
- Maps are already out dated when they are published, especially for species that show a strong decline or for invasive species.
- Changes in survey effort mask changes in abundance of species.
- Maps may show effects of a temporal bias in geographical effort

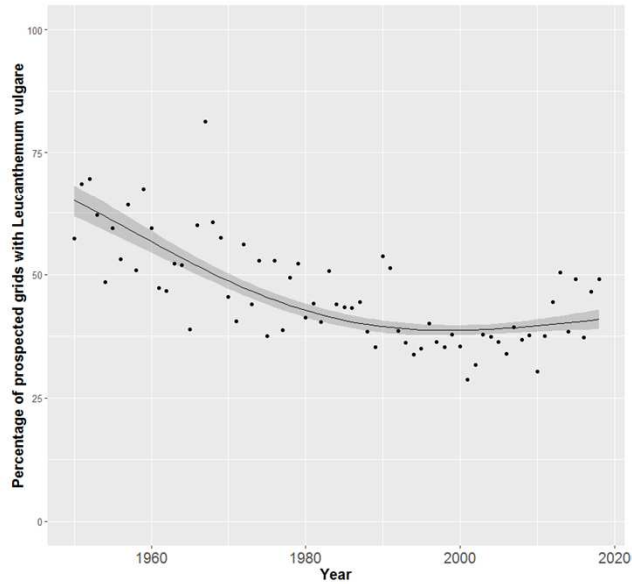
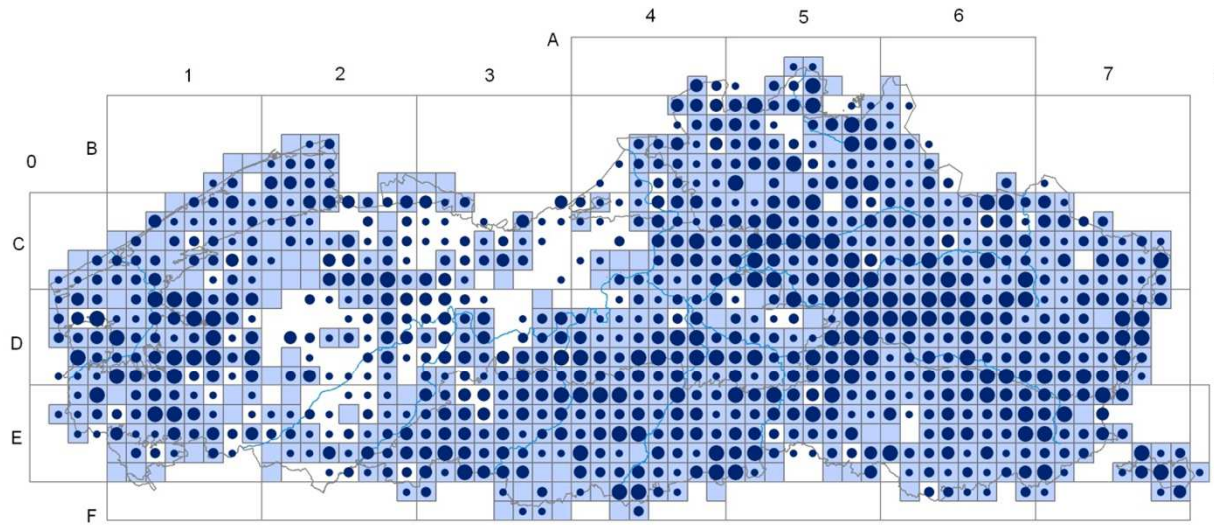
Number of prospected grid cells/year



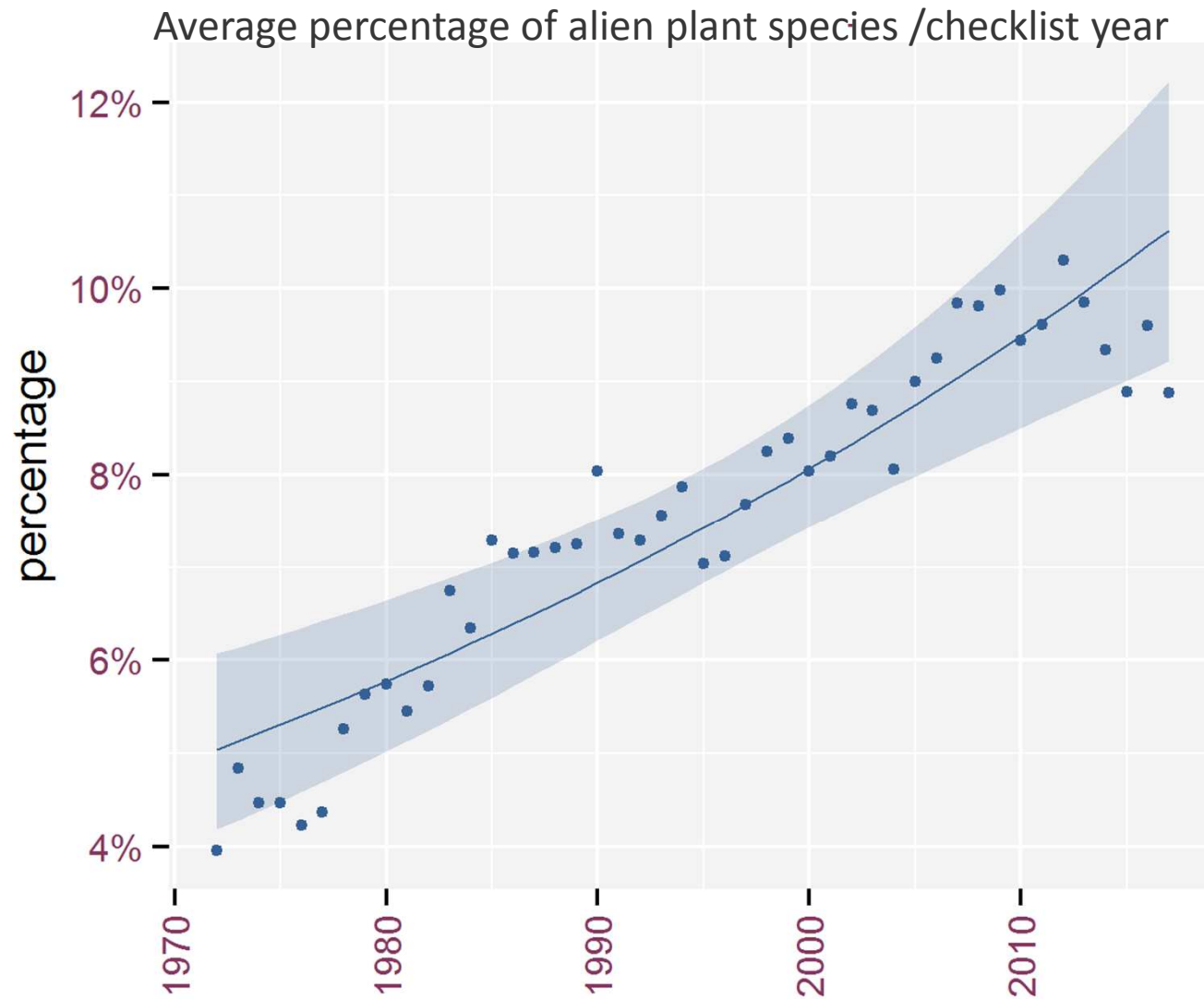
Centaurea cyanus L.



Leucanthemum vulgare L.



Summarized trends for groups of species



From 2015 onwards: standardized network of 450 random stratified grids of 1km²

- 1/5 of the 450 grids each year prospected
- Repetition each 5 year
- Purpose: detecting trends for common species without temporal geographical bias

