# POROČILO

# O ŠTUDIJSKEM POTOVANJU PO ZDA

M. Piskernik

el. 210

# P O R O Č I L O

## o študijskem potovanju po ZDA

## od 30. IV. do 27. IX. 1963

Milan Piskernik, Ljubljana

Inštitut za gozdno in lesno gospodarstvo Slovenije

Predloženo poročilo je sestavljeno po naslednji dispoziciji:

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## 1. SPLOŠNE UGOTOVITVE GLEDE PROGRAMA IN IZVRŠENEGA ŠTUDIJA

Podajam bistvene vtise s svojega študijskega potovanja po ZDA, izvršenega med začetkom maja in koncem septembra l. 1963 skupaj z ing. Ž. Karapinom iz Zagreba in ing. M. Ivanovičem iz Kotora.

Ko sem bil lani poleti ob prvem stiku z misijo AID seznanjen z okvirnim programom bodočega študija, sem ga razumel v naslednjem smislu (prav tako kot tudi oba moja kolega):

a) študij se bo vršil predvidoma na dveh univerzah ali institutih, na enem na zahodu in enem na vzhodu ZDA;

b) študij bo omejen na duglazijo (na zahodu) in zeleni bor (na vzhodu);

c) vsak izmed naše trojice bo imel svoj lastni program v skladu s svojo specialnostjo (genetika - zaščita - gojenje).

Zlasti sem računal s tako izvedbo programa zato, ker je bila ustno izrecno omenjena specializacija na dveh ustanovah in ker sta bili v okvirnem programu omenjeni samo gornji dve drevesni vrsti, in še posebno zato, ker sem v okviru skupine bil izrecno določen za genetiko kot predstavnik Inštituta za gozdarstvo Slovenije z uradnim dopisom Zavoda za tehnično pomoč. Tako sem se takoj lotil pripravljalnega študija v okviru moje bodoče zadolžitve, ki sem ga po lastnem preudarku še bistveno razširil s poglobljeno analizo podnebnih razmer Slovenije, pa tudi s temeljito analizo razpoložljivih podnebnih podatkov s celotnih področij arealov duglazije in zelenega bora. Zbral sem mnogo podatkov in delal v vsem izvenslužbenem času nepretrgoma vse od začetka julija 1962 do konca marca leta 1963.

Podrobnega programa nisem prejel do odhoda in sem bil nemalo presenečen, ko sem v Washingtonu spoznal, da je iz specializacije na dveh krajih nastalo potovanje po številnih gozdarskih institucijah, večinoma s postanki po en sam teden, in da bo program skupen za vse tri, torej nespecifičen. Zato na mnoge aspekte študija nisem bil pripravljen, še posebno ne, ker so prišle v program nekatere nove drevesne vrste razen duglazije in zelenega bora in je tako bil program bistveno razširjen.

Vendar sem tudi takoj spoznal, da bo imel tak način posredovanja informacij mnoge dobre strani, ker bo dal širok vpogled v celotno gozdarsko raziskovalno in praktično dejavnost Združenih držav in zagotovil kontakte z mnogimi raziskovalci in praktiki, ker bo v prihodnje neizčrpen vir informacij za bodoče delo.

Zaradi tega sem se s spremembo hitro sprijaznil. Nisem se pa in se ne bom sprijaznil z dejstvom, da sem moral začeti študij v ZDA 14 dni za mojima kolegoma, in to iz jezikovnih razlogov - pa naj je bila to odločitev ameriške misije ali Uprave za tehnično pomoč ali obeh; saj sta imela moja kolega ravno toliko časa, da se predhodno naučita angleščine kot sem ga imel jaz, ki se je nikdar nisem učil v šoli niti na kakšnem tečaju niti s kakršnimkoli učiteljem. Zaradi tega samovoljnega ukrepa sem se namučil na Jezikovnem inštitutu Univerze v Georgetownu, ker nisem imel pred odhodom nobene slušne in govorne prakse, in se trudil z dodatnim slušnim programom, odobrenim na lastno željo. Končno nisem dobil na Jezikovnem inštitutu v Georgetownu nobenega spričevala o uspešno dovršenem tečaju, ker nisem bil tam vsaj 3 tedne, kakor določajo njihovi predpisi, medtem ko sta moja kolega spričevala dobila, seveda v svojo korist, ne v škodo.

Ko se je začel odvijati strokovni gozdarski program, se je takoj pokazalo, da bo spričo izredne delavnosti in podrtvovalnosti naših instruktorjev zelo intenziven in zelo bogat. Naša skupina je bila sposobna sprejemati vse, kar je bilo povedanega, tako v jezikovnem kakor v strokovnem pogledu. Bilo pa je to v prvem mesecu zelo težko predvsem zaradi vročega in vlažnega podnebja v jugovzhodnih državah in zaradi nenavadno tihega govorjenja večine naših instruktorjev, ki ga Evropa in še zlasti Jugoslavija ne pozna.

V prvem mesecu študijskega potovanja smo vsi člani skupine spoznali, da nam bo način posredovanja podatkov s svojo razdrobljenostjo povzročil velike težave pri sestavi končnega poročila; vse se je namreč odvijalo v osebnih razgovorih, ki so bili bodisi zelo kratki in zgoščeni (obiskali smo po pet ali več strokovnjakov na dan) ali pa so bili raztegnjeni na ves dan z enim strokovnjakom, večinoma na terenskih ogledih. Zato smo na Oregonski univerzi v Corvallisu skušali vplivati na situacijo

teko, da smo takorekoč izsilili dvodnevni študij v gozdarski knjižnici, vendar smo si s tem skoraj nakopali zamero, rezultatov pa ni moglo biti drugih kot da smo z veliko porabo časa našli zanimive publikacije, katere smo pa potem le delno lahko dobili kot separate v trajno uporabo. Razume se, da za študij publikacij ni bilo časa. Zato smo se poslej skoraj popolnoma prepustili programu in nismo več skušali vplivati nanj.

Če ocenim vse s strokovnega dela potovanja kot celote, moram reči, da so zelo ugodni. Zastopniki ustanov, ki smo jih obiskali, so nas večinoma sprejemali kot da sploh nismo tujci, seveda pa je to imelo podlago tudi v naši jezikovni sposobnosti in našem zanimanju za vse kar so nam povedali in pokazali. Trudili so se, da nam posredujejo čimveč svojih izsledkov in informacij o najnovejših tekočih delih. Zlasti so se pri tem odlikovali g. R. Silen, genetik (Forest Science Laboratory, Corvallis - Oregon), A. Berg, profesor gojenja (University of Oregon, Corvallis), W. Foiles, gojitelj (Boise Research Unit, Boise - Idaho) in T. Mc Conkey, gojitelj (University of New Hampshire, Durham).

Publikacije iz vseh raziskovalnih panog gozdnega gospodarstva smo dobivali v neverjetnem številu in s tem dobili zanesljive vire podatkov za sestavo strokovnega poročila, ki bi ga bilo brez tega mnogo težje sestaviti tako, da bi dal konkretne podatke, uporabne za podlago praktičnim ukrepom pri uvajanju ameriških eksot, ali pa predstavljajoče praktične ukrepe same.

V splošnem je celotni strokovni program imel to napako, da je povzročil bežne obiske številnih laboratorijev v posameznih raziskovalnih ustanovah namesto dveh ali treh, kjer bi naša skupina lahko delala praktično na različnih aparaturah.

Če ocenim koristnost študijskega potovanja v celoti, moram do neke mere ponoviti, kar sem že napisal. Naštel bi naslednje, kar se tiče mene osebno. Vzpostavil sem kontakte z mnogimi gozdarskimi strokovnjaki in nekatere od njih tudi zainteresiral za izsledke v svojem ožjem specialnem področju fitocenološkega in ekološkega raziskovanja Slovenije. Glede na to, da so takorekoč vsi ti gozdarji zelo pripravljeni za vzdrževanje strokovnih kontaktov, smem računati na stalen vir informacij z njihove strani, ki so mi vsekakor potrebne, ker je sme-

riška gozdarska znanost v kropkem razvoju. Spoznal sem karakteristiko in specifičnosti ameriškega gozdarstva v primeri z našim tako v prirodnih osnovah kakor v raziskovalni tematiki in gospodarstvu; o tem imam podatke iz lastnega opazovanja in v bogati sprejeti literaturi. Mnogo podatkov sem dobil tudi na nekaterih ustanovah, ki niso bile v programu in sem jih obiskal na lastno pobudo. Pridobljena spoznanja in podatke bom lahko uspešno porabil v okviru svoje ožje zadolžitve v skladu z logično in nujno delitvijo dela znotraj naše skupine, to je v ekologiji (ekologiji drevesnih vrst, klimatologiji in tudi pedologiji) in genetiki, povezani z gojenjem hitrorastočih iglavcev, ki smo jih študirali v ZDA: vednozelene sekvoje, duglazije, zahodnega zelenega bora, ameriškega rdečega bora in vzhodnega zelenega bora.

Veliko strokovno uslugo sta mi napravili dve ustanovi, na katerih sem se osebno oglasil zaradi določenih podatkov in publikacij izven določenega programa. Ti dve ustanovi sta bili Ameriški inštitut za poljščine v Silver Springu, Maryland in Zvezni Meteorološki Urad v Washingtonu. Za storjeno uslugo se obema ravnateljema g. M.Y. Huttonsonu in g. dr. Landsbergu najlepše zahvaljujem. G. dr. Landsberg je posredoval pri Zveznem vremenskem dokumentacijskem centru v Ashevilleu, Severna Karolina, da sem od tam dobil veliko število pomembnih tiskanih virov; zanje se najlepše zahvaljujem ravnatelju tega centra g. C.L. Bargerju.

Ob zaključku se želim najlepše zahvaliti osebam na Inštitutu za gozdno in lesno gospodarstvo Slovenije v Ljubljani, ki so spričo več kandidatov podprle in odobrile mojo kandidaturo; to so tovariši ing. Miran Brinar, ing. Jože Miklavžič in ravnatelj inštituta ing. Bogdan Žagar. Obenem izrekam enako zahvalo vsej delovni skupnosti inštituta, ki je prispevala sredstva za uresničitev študija. Razen tega moram omeniti, da so bila za podrobno izvedbo poročila omogočena dodatna sredstva, deloma sicer iz sredstev za moja redna raziskovalna dela; tu sem se dolžan zahvaliti ing. Bogoslavu Žagarju, ki je vestno proračunal in tabelarno uredil veliko množico strokovnih podatkov.

Končno je tu pravo mesto za odkritosrčno zahvalo obema uredoma za tehnično pomoč, tako ameriškemu kakor jugoslovanskemu. Nazadnje pa naj omenim tiste, ki so k izvedbi programa največ prispevali strokovno in organizacijsko, to je strokovno in

upravno osebje vseh gozdarskih ustanov, ki jih je naša skupina obiskala, in jim izrečem najlepšo zahvalo: imenoma bom navedel samo g. R.C. Fulcherja od Izobraževalnega oddelka za inozemce pri Kmetijskem ministrstvu; mislim pa s tem vse osebe, ki so žrtvovale svoj čas in nudile svoje znanje za instruktažo naše skupine ali ji kakorkoli pomagale skozi pet mesecev študijskega potovanja, in pa vse one na zahodu in vzhodu Združenih držav, ki so gostoljubno odprli svoje domove in nas sprejemali kot dobrodošle goste.

Naj mi bo dovoljeno izreči mišljenje, da bi bil g. dr. R. Silen po svojih strokovnih in osebnih kvalitetah zelo primeren za eksperta v vseh, zlasti še genetskih vprašanjih, ki zadevajo hitrorastoče smrekove iglavce, v prvi vrsti duglazijo.

## 2. KRATEK PREGLED POTEKA ŠTUDIJSKEGA POTOVANJA

Tu ne bom obravnaval programa, ki se je odvijal na Ministratvu za kmetijstvo in na Ameriškem jezikovnem inštitutu, temveč samo njegov ožji strokovni del.

1. Državna Univerza Sev. Karoline (North Carolina State College), Raleigh. 28. in 29.V.

Prof. dr. Maki, pedolog, nas je seznanil z organizacijo in raziskovalnim programom gozdarskega oddelka univerze ter omogočil kratke razgovore s fiziologom dr. Perryjem in vodjem pospeševalne službe g. Grayem.

Prof. dr. Zobel, genetik, nas je peljal v južne predele Sev. Karoline v območje južnega črnega bora Pinus taeda, pokazal sestavo tamkajšnjih prirodnih gozdov, nakazal genetične probleme črnega bora in razložil prijeme v drevesnici te drevesne vrste pri Lumbertonu.

2. Hidrološki laboratorij v Coweeti (Hydrological Research Laboratory in Coweeta), Sev. Karolina (Apalaško gorovje). 31.V.

Tu smo pod pokroviteljstvom direktorja Hewletta in vodstvom g. Swifta in Hibberta spoznali raziskovalno dejavnost ustanove, ki obravnava vse aspekte talne erozije in čistoče vode, ki prihaja v poštev za zajetje kot vodovodna voda.

3. Tennessee Valley Authority (TVA), raziskovalna postaja v Norrisu, Tennessee. 5. - 14.VI.

Kontakti z raziskovalci postaje g. Beanom, Doubom, dr. Zargerjem, dr. Fosterjem, Ellertsenom in Lehtom. Na programu so bili ogledi nasadov iglavcev (borov) in listavcev (tulipovca) na opuščenih kmetijskih zemljiščih in pregled drevesnice, ki pripada postaji, ter razprave o delih, ki se tam vršijo, pregledi nasadov superiornih dreves bora Pinus echinata, in arboretuma najvažnejših vrst ameriških borov ter končno pogozdovanje rudniških goličav z raznimi vrstami borov in listavcev (Pinus echinata, Populus deltoides) v Zahodni Virginiji.

4. Tihomorska jugozahodna gozdarska raziskovalna postaja (Pacific Southwestern Forest and Range Experiment Station), Berkeley, Kalifornija. 17. - 18.VI.

Razgovori z raziskovalci postaje g. Ericksenom, Woolfolkom, Glennonom, Hubbertom, Wilsonom in Stevensonom o problemih

erozije, požarov in vodnega gospodarstva, ki so specifični za Kalifornijo.

5 a. Zahodni genetični inštitut (Western Genetics Institute), Placerville, Kalifornija. 19. - 24.VI.

Strokovni kontakti z direktorjem dr. Righterjem in entomologom Smithom. Sodelovanje pri križanjih kalifornijskih borov v Sierri Nevadi. Pregled borovega arboreta, ki vključuje večino borovih vrst sveta. Obisk pragozda orjaške sekvoje v Parku Calaveras.

b. Gozdna direkcija (Forest Service Headquarters), Placerville, California. 25. - 26.VI.

Ogled nasadov raznih vrst pacifiških borov v različnih nadmorskih višinah; ogled drevesnice, ki pripada gozdni direkciji, in tehnične opreme, ter ogled borove semenske plantaže.

6. Direkcija narodnega gozda Six Rivers (Six Rivers National Forest Headquarters), Eureka, Kalifornija. 1. - 5.VII.

Ogled gozdov duglazije v porečju Smithove reke in diskusije o načinu gospodarjenja in izkoriščanja z g. Brownom. Ogled gospodarjenja in izkoriščanja v gozdovih vednozelene sekvoje v spremstvu upravitelja g. Boea.

7 a. Oregonska Državna Univerza (Oregon State University), Corvallis, Oregon. 8. - 12.VII. in 15. - 16.VII.

Ogled gozdov duglazije na raznih mestih v Kaskadah pod vodstvom prof. dr. Berga in prof. dr. Hermanna in razpravljanje o gozdnogojitvenih raziskovalnih delih v teh gozdovih; pedološki ogled duglazijinih gozdov v Obalnem gorovju (Coastal Range) z g. Youngburgom; kontakt z entomologom prof. dr. Rudinskim; razgovor s fitopatologom dr. Wrightom; razgovor z genetikom g. Chingom; razgovor s fiziologom dr. Lavenderjem; ogled poskusnih pogozdovanj s skrivenčenim borom (Pinus contorta) v vzhodnem Oregonu s prof. Kudrjavcevim.

b. Gozdarski znanstveni laboratorij (Forest Science Laboratory), Corvallis, Oregon. 17. - 19.VII.

Razpreve o genetičnih in gojitvenih problemih z duglazijo z dr. Silenom v kabinetu in v gozdovih; ogled arboretuma v Wind Riverju.

8. Tihomorska severozahodna gozdarska raziskovalna postaja (Pacific Northwestern Forest and Range Experiment Station),

Portland, Oregon. 22. - 23.VII.

Razgovori z ekologom g. Trappejem o ekologiji raznih ras duglazije, in s pedologom g. Tarrantom o vplivu golosečno - požigalnega načina gospodarjenja na tla v gozdovih duglazije.

9. Weyerhaeuserjeva družba (Weyerhaeuser Company Research Laboratory), Centralia, Washington. 24. - 26.VII.

Razgovori s fiziologom g. Redinskejem, gojiteljem g. Staeblerjem, prirastoslovcem g. Kingom in pedologom g. Steinbrennerjem, in terenski ogledi nasadov in gozdov duglazije na drevesnih farmah družbe.

10. Ekspozitura Tihomorske severozahodne gozdarske raziskovalne postaje v Olympiji, Washington (Olympia branch of the Pacific Northwestern Forest and Range Experiment Station). 29. - 31.VII.

Razpreva o gozdnogojitvenih aspektih pri duglaziji na terenu pod vodstvom g. Reukema; razgovor z dr. Radwanom o uporabljanju kemičnih sredstev za preprečevanje škod po divjadi. Ogled gozdov raznih drevesnih vrst na preseku Olympia - Tihi Ocean pod vodstvom direktorja ekspozitura g. Wardena.

11. Washingtonska univerza (University of Washington), Seattle, Washington. 1. - 2.VIII.

Razgovor s fiziologom dr. Walkerjem o laboratorijskih eksperimentih za kontrolo asimilacijskih procesov, in ogled elektronsko merjenih terenskih analiz asimilacijskih procesov na mladicah in odraslih drevesih duglazije pod vodstvom dr. Scotta.

12. Gozdarski raziskovalni laboratorij (Forest Research Laboratory), Moscow, Idaho. 5. - 23.VIII.

Obravnavanje genetičnega raziskovalnega programa (dr. Bingham); razgovor s prirastoslovcem g. Stagejem o korelaciji prirastka in podnebja; ogled semenske plantaže zahodnega zelenega bora v narodnem gozdu Kaniksu; pod vodstvom g. Wissja in g. Hoffa; ogled genetsko - semenarskih laboratorijskih naprav in rastlinjaka; razgovori o biokemičnem aspektu odpornosti zahodnega zelenega bora za mehurjevko z g. Hanoverjem; ogled gozdov zahodnega zelenega (zelenega) bora v enem od raziskovalnih gozdov Moscowske postaje z dr. Deitschmanom; ogled škodljivcev v gozdovih zelenega bora z entomologom g. Johnsonom; ogled glivičnih bolezni v teh gozdovih z dr. Millerjem; ogled škode po raznih vrstah omele na raznih drevesnih vrstah v naravi

dnem gozdu Priest River z dr. Wickerjem; razlega raziskovanja fiziologije mehurjevke na zahodnem zelenem boru (g.Collins in König);tipološki ogled gozdov v porečju reke Clearwater, ogled nasadov zahodnega zelenega bora v Musselshellu ter meritve v gozdu tega bora pri Pierceu z g.Boydom.

13 a. Gozdarski raziskovalni laboratorij (Boise Research Unit), Boise, Idaho. 26. - 28. VIII.

Ogled gospodarjenja in problemov v gozdovih zahodnega rdečega bora in problemov v nasadih tega bora z g. Pollockom.

b. Direkcije Boiseškega narodnega gozda (Boise National Forest Headquarters), Boise, Idaho. 29. - 30. VIII.

Ogled drevesnice zahodnega rdečega bora in vegetativne stabilizacije vodozbirnega bazena pri Boiseju z g. Rozynskom; ogled pogozdovalnega predela in tehničnih pogozdovalnih del z g. Doupeyem.

14 a. Laboratorij za predelovanje gozdnih proizvodov (Forest Products Laboratory), Madison, Wisconsin. 3. - 4. IX.

Razgovori o tekočih raziskovalnih delih: o raziskavah lastnosti lesa z g. Pillowom in g. Prominom, o raziskavah rasti debla z g. Smith, in o lesnih škodljivcih z g.Seentherjem.

b. Wisconsinska Univerza (University of Wisconsin), Madison, Wisconsin. 5. - 6. IX.

Razgovor s predstavnikoma pospeševalne službe g.Petersonom in g. Cunninghamom; razgovor s profesorjem fiziologije dr.Kozlowskim.

15. Newhampshireska Univerza (University of New Hampshire), Durham, New Hampshire. 9. - 13. IX.

Ogled gozdov vzhodnega zelenega bora in obravnava njihove gozdnogojitvene problematike z g.de Comkeyem in g. Graberjem; ogled Hopkinsa vega, eksperimentalnega gozda v Williamstownu, Massachussets, z genetikom dr.Santamourjem in g.Cunninghamom.

16. a. Gozdarski entomološki in fitopatološki laboratorij (Forest Insects and Diseases Laboratory), New Haven, Connecticut. 16. - 18. IX.

Razgovor z g.Watersom o organizaciji laboratorija in s fitopatologom g. Hookom o glivnih škodljivcih na vzhodnem zele-

nem boru; ogled Hopkinsonove entomološke zbirke; ogled drevesnice sinje smreke v Pachugu z g. O'Dellom.

b. Yaleska univerza (Yale University), New Haven. 19.IX.

Razgovor z dekanom dr. Carratom o organizaciji univerze; s prof.dr. Lutzom o ekološko-tipoloških problemih; s prof. dr. Smithom o gozdnogojitveni praksi; s prof.dr. Hensenom o entomoloških vprašanjih; s prof. dr. Cowlingom o fitopatoloških problemih in s prof.dr. Mergenom o genetskih raziskovanjih.

## 4. EKOLOGIJA NITROBAKTOČIH IGLAVCEV, OBRAVNAVANIH NA ŠTUDIJSKEM POTOVANJU

### Vednozelena sekvoja (Sequoia sempervirens).

Areal se razteza v pasu ob obali Tihega oceana vzdolž osrednje in severne Kalifornije. V južnem delu je čisto ozek in raztrgan v majhne otočke, v severnem pa širok do 20 km in strnjen v obsežne čiste gozdove z 90% sekvoje; posamezna drevesa in skupine segajo še nekaj kilometrov dalje v notranjost v dolinah in na zahodnih pobočjih, vključene v gozdove zelene duglazije. V višino sega le do kakih 500 m.

Rastišča so za evropske razmere nedosegljive kakovosti. Globina tal, ki so vedno silikatna, znaša redno več metrov in to velja z ne pogostimi izjemami tudi za glavne ter stranske grebene in strmejša pobočja. Zdi se, da globina 5 m ni nobena redkost, skoraj vseeno v kakšnem reliefu. Razume se, da ves profil ni biotiziran, temveč je pretežni del le mineralen, korenine pa ne segajo globlje kot je v skladu z 70-100 ali več metrov visokim deblom. Toda taka tla imajo neizčrpno zalogo vlage, kar je za dobro rast najvažnejše; ker so spričo peščenoilovnatosti hkrati dovolj gosta in dovolj rahla in zračna, omogočajo zelo zadovoljivo kapilarno dviganje vode, ki je neko-

pičena v njih v globljih plasteh ali na ravnem ali malo nagnjenem zemljišču celo zastaja na nepropustni kamenini.

Toplota je prav tako skrajno ugodna. Povprečne letne temperature se gibljejo med 15° in 11°C ob obali in do najmanj 9° na zgornji višinski meji. Razpon med srednjo toploto najtoplejšega in najhladnejšega meseca znaša samo 5 - 1o°, v absolutnih številkah pa so temperature 15°- 2o° in 8 - 12°. Skrajni toplotni upadki ne dosegajo -1o°C.

Toda začudi nas, da sta mokrota in vlaga samega podnebja naravnost skromni. Celoletne padavine znašajo v južnem delu komaj okrog 6oo mm, v severnem največ 12oo mm. A ne samo to, temveč poleti padavin skoraj ni, julij in avgust sta pogosto brez dežja, povprečno pa ga pade od junija do avgusta največ okrog 3o mm, a le v severnem delu areala.

Tudi zračna vlaga je v vegetacijski dobi pičla, in to kljub neposredni bližini oceana in navedbam, da so megle pogostne, in kljub zelo zmernim temperaturam. V zimskih mesecih znaša sicer do 76 - 87%, v letnem povprečju pa le 55 - 75%; tudi poleti ni velika, a je vendar blizu letnega povprečja ali pa ga celo nekoliko presega (6o - 7o%).

Vrsta in okolje Sekvoja dosega velikanske razsežnosti in tisočletno starost kot reliktna drevesna vrsta, ohranjena zaradi prostega premika vzdolž obal v času močnejših podnebnih kolebanj. Ima posebno življenjsko silo, ki se očituje ne samo v skrajni dolgoživosti, temveč tudi v sposobnosti, da odžene iz prastarega panja bujneje kot naša bukev in da živi dalje ob pavejah (drugotnih debelnih vejah) brez vsakršne krošnje, ki ji jo je odlomil vihar, medtem ko ji že v ranah že poganjajo gruščki vresnic. To silo izkorišča v ugodnih toplotnih razmerah, ki dopušča v vsem arealu možnosti za vzgojo več vrst evkaliptov, pri tem pa ji ravno vsakoletna dvomesečna ali daljša popolna suša in skromna zračna vlaga pomagata izkoristiti skrajno ugodno talno globino, globinsko vlago in

zrnatost.

Iste podnebne razmere, ki so zaradi silnega izravnavajočega vpliva oceana omogočile starodavni sekvoji preživetje kljub temu, da je tisoč let prikovana na isto mesto in tako izpostavljena vsem okolnim spremembam in neštetim požarom, so bile tisti činitelj, ki je - brez ledenodobne prekinitve ali celo destrukcije - - ustvaril današnja neprekoseljiva tla sekvojinih rastišč. Ugodna toplota namreč omogoča biološko aktivnost v tleh tudi pozimi, kar je ob zimskih temperaturah med 8 in 12° (pri nas celoletni povpreček na Dolenjskem in v Vipavski dolini) in nakopičenjem padavin v jesenskih mesecih razumljivo. Poleti je dvigajoče se vlage spet obilo, ker so padavine spomladi obilne, tako da je površje zemlje vedno vlažno, poraščeno z vlagoljubnimi rastlinami. V takih razmerah je od pračasov neprekinjeni razvoj zrnate (peščene) silikatne kamenine poglobil tla do današnjih razsežnosti, pri tem pa ga zaradi zelo dobre propustnosti tal, a tudi zaradi dobre in skozi sto-in stoletja neprekinjene zastrtosti po zelo na gosto stoječih orjaških drevesih erozija ni v ničemer zmotila.

Biološke lastnosti. Pomlajevanje zagotavlja na prirodnih rastiščih zadostna količina svetlobe, tako da je polovični zastor preostalih dreves prejšnjega sestoja popolnoma primeren.

## Priobalna duglazija (Pseudotsuga Douglasii viridis)

Areal zelene duglazije ni ostro omejen, ker gre za posebno raso ali pa različek znotraj duglazije kot vrste. Amerikanski gozdarji sami mislijo, da niti znanih glavnih treh ras ni potrebno ločevati po morfoloških posebnostih; pač pa da je umestno razlikovati ozemeljske rase, znotraj katerih se - zlasti

v priobalnem delu areala - pojavljajo različne morfološke rase, torej poleg zelene tudi modra in siva duglazija. Te skupaj rastoče rase pa so v očeh gozdarskega strokovnjaka praktično identične zlasti po prirastku, pa tudi sicer, ker genetično niso medsebojno izolirane - česar pa ni mogoče trditi za skupek vseh regionalnih ras duglazije kot celote -, ampak tvorijo druga z drugo vse mogoče morfološke, zlasti po barvi iglic opazne prehodne oblike. Glavni ozemeljski rasi sta torej priobalna duglazija in notranjegorska duglazija; meja med obema pa očitno še ni potegnjena. Vzelo bi se lahko, da je duglazija v priobalnem gorovju Kaskad derivat obalne rase, kar brez dvoma drži za oceansko stran tega gorovja, medtem ko se duglazija notranje strani nagiba k notranjegorski rasi. Pri točnem diferenciranju bi jih morda ugotovili več takih pasovnih ras, ki spremljajo postopno spremembo podnebja od obmorskega do celinskega.

Amerikanski gozdarji sami razlikujejo še nadaljnje ožje, za naše pojme pokrajinske duglazijine ekološke rase, ki jih kot pri ostalih zahodnih iglavcih - za semenarsko službo priznavajo na desetine. Poleg tega pa vendarle skušajo še s poglobitvijo morfološkega študija najti biotvene razlike med glavnimi rasami, pri čemer se opirajo predvsem na podrobno oblikovanost koreninskega sistema.

Priobalna duglazija seveda tudi sama še zdaleč ni enotna, in edino, kar jo napravlja za nekako enoto, je razmeroma najugodnejše podnebje znotraj celotnega duglazijinega areala. S tem, da priobalna duglazija seže od območja suholjubnih hrastov na jugu kot primes v njihovih gozdovih preko areala vednozelene sekvoje in lastnih čistih gozdov naprej proti Aljaski do 55. širinske stopinje, se členi v prav različne ekotipe, ki jih najbolje zajamemo s podnebno razčlenitvijo.

K obali pride duglazija na jugu severno od San Francisca. Na jugu ne sega v gorovju južneje od 37. vzporednika, optimalni del areala pa ima v zahodnem Washingtonu v nekaterih predelih (v zaledju Grayevega zaliva) med 100 - 700 m nadm. višine in v južni Britanski Kolumbiji.

Rastišča kažejo, kar se tiče fizikalnih talnih lastnosti, precej enako podobo, zlasti, ker tudi duglazijin pribalni areal zajema samo silikatne in bazične eruptivne kamenine. Pojavlja pa se precejšen vlažnostni raspon, ker so najboljša rastišča vlažna vse leto, medtem ko so druga, še vedno dobra, pdeti na površju in nekoliko pod njim na videz suha. Oba tipa označujejo na zunaj določene pritalne rastline, posebej pa je omeniti vmesni tip, ki je poleti svež, zanj so pa značilni mahovi, ki so istih vrst kot jih najdemo na peščenjakih in prakameninah v naših manj vlažnih smrekovih gozdovih in nasadih ter v rdečeborovih gozdovih. Tudi talna globina je povsod velika, in tudi tudi so značilne večmetrske potencialne globine. Tekstura je peščenoilovnata, mnogokrat s poudarjeno peščeno komponento, tako da so tla optimalno zračna.

Podnebne razmere v arealu so zelo ugodne. Letni povprečki blizu obale so med 15 in 9°C na ozemlju Združenih držav, v Kanadi do 7°. Letni raspon znaša tam 5 - 20°, a tudi v pribalnem gorovju ni večji. Poletne mesečne toplote dosežejo 13 - 20°, zimske v povprečju 8 do -1° ob obali in do -4° izpod 1000 m, medtem ko so znani absolutni vrhunci od 32 do 42° in absolutni upadki od -7 do -25° blizu obale in do -27° izpod 1000 m visoko.

Padavinski raspon je znaten in gre od 600 mm na jugu do 2500 mm v severjejšem delu. Pri tem je posebno pomembna razlika v količini poletnih padavin. Medtem ko v južnem delu pogosto manjkajo, dosežejo na severu Združenih držav 50, v Kanadi do 110 milimetrov celo v najsušjem poletnem mesecu. Njihov letni razpored je kot pri sekvoji "sredozemski", ker sta dva poletna

meseca najsušja v letu.

Pomemben je velik raspon zračne vlage, ki znaša pri povprečnih letnih vrednostih 30% med 55% na jugu in 85% na severu. Tudi tu se ponovi okoliščina, da je poletna zračna vlaga ugodna, tako da ima celo najmanj vlažni poletni mesec višjo zračno vlago kot nanese celoletni povpreček, in sicer od 60 - 86%. Vendar po vsem videzu poletna vlaga ni vedno ugodna, ker v nekaterih krajših razdobjih ne znaša povprečno več kot 40% v najsušjem mesecu.

Vrsta in okolje. Priobalna duglazija je hitrorastoča drevo, vendar je njen prirastni raspon tako velik, da na jugu ne presega naše jelke ali smreke na slabših nižinskih rastiščih, na severu pa daje na najboljših rastiščih, med katera sodijo tudi strmejše lege, desetkrat toliko. Na slabših rastiščih, ki se nahajajo predvsem v južnih legah ne glede na globoka tla, se razvija srednje dobro kot naša jelka v sušjih predelih našega Visokega Krasa, zlasti na vzhodnem robu visokokraških verig.

Da je priobalna duglazija tako dobre rasti, sta vzrok ugodno okolje in podobna razvojna usoda kot jo je preživela vednozelena sekvoja. Razlika je v tem, da so pripadla duglaziji zaradi biološke nadaločnosti sekvoje slabša rastišča tako v talnem kakor podnebnem oziru.

Biološke lastnosti. Vedeti moramo, da je duglazija v svojem prirodnem arealu izrazito svetloljubna drevesna vrsta, ki se pod zastorom ne pomlaja. Seveda to ni povsem brez izjem. Ker je namreč obenem silno občutljiva na skrajne toplotne vrhunce, dokler je klica in nežna mladica - to velja zlasti za priobalno raso - mora na prisojnih pobočjih imeti rahlo zaščito, bodisi da jo dajejo na redko stoječa drevesa ali pa grmi, štori, ležeča debla ali mikroreliefne izbokline. S svetloljubnostjo se druži izrazito pionirski značaj duglazije. Zato se mahoma na gosto pomladi na brežinah cestnih usekov, seveda pa nič manj na

golosekih, kjer spravilo hlodov velikih mer in nato požiganje odpadkov odpreta neštevilne rane na tleh sečišč. Evropskemu gozdarju se zdi takšno ravnanje nepravilno, v resnici pa je samo grobo posnemanje narave, ki je ohranila duglazijo in ji dovolila zgraditi nepregledne gozdove edino s neprestanimi prirodnimi požari, pomnoženimi vsekakor z namernimi in nenamernimi požigi, ki so jih skozi tisočletja povzročala indijanska plemena. Ker erozija na požganinah niti v strminah spričo poroznih tal ne nastopa, so si tla pod novim sestojem hitro opomogla in se dalje bogatila ter razvijala.

Zahodni zeleni bor (Pinus monticola).

Areal zahodnega zelenega bora je po svoji razsežnosti razmeroma omejen in je zlasti utesnjen, če ga primerjamo z arealom duglazije kot vrste. Po eni strani ne sega do obal Tihega oceana, ker se tudi na severu v njegovi bližini v Kaskadah drži le iznad 900 - 1000 m visoko kot primes, južneje pa se od obale vse bolj odmika, tako da ga najdemo v severozahodni Kaliforniji (ne v severovzhodni) že samo iznad 1500 m, v osrednji (v južni ne več) pa iznad 2200 m visoko. Vsa ta nahajališča so samo rastišča posameznih dreves in skupin; gozdove razvije zahodni zeleni bor le v severnem Idahu v višinah 650 - 1500 m in prestopi od tam v južni del vzhodne Britanske Kolumbije, pri tem pa ima ostro južno mejo, ki jo tvori reka Clearwater, mejnica med severnim in južnim delom Idaha. Najdlje na vzhod sega v zahodno Montano severno od 47. vzporednika.

Rastišča so glede tal zelo različna, kar se tiče njihove globine, ker seže areal v območja, ki so bila pod ledeno odejo. Vendar kljub temu ni izrazito plitvih tal razen po grebenih, ker je ta orjaški bor sposoben aktivirati silne količine mineralnih tal. Tekstura teh tal, ki so tudi silikatna, je peščeno-

ilovnata, in tla so zračna, dobro kapilarna.

Medtem ko so obrobna rastišča podnebno podobna duglazijinim, ima jedro areala, kjer tvori ta bor gozdove, nekaj svojih potez. Srednja letna toplota je največ 9°, najmanj 4°C; zime so hladne, najhladnejši mesec ima največ -2°; toplotna celinskost je označena z razponom 21 - 23° med najtoplejšim in najhladnejšim mesecem; skrajni toplotni upadki do -25 do -37°, v zahodni Montani verjetno do -45°, vrhunci med 35 - 41°; padavine so pičle in imajo zelo majhen razpon (od 500 - 900 mm). Zračna vlaga je prav gotovo nizka, na kar lahko sklepamo po podatkih obrobnih postaj in najbrž nima večjih razponov; ocenimo jo lahko v letnem povprečju na 60%, v najmanj vlažnem poletnem mesecu na 40%.

Z vednozeleno sekvojo in zeleno duglazijo deli zahodni zeleni bor poletno sušo s 15 - 30 mm dežja v najsušjem mesecu, nekoliko manj izrazito v Britanski Kolumbiji.

Vrsta in okolje. Ozek ekološki razpon zahodnega zelena bora nakazuje, kot pri vednozeleni sekvoji, njegov reliktni značaj. Za naše pojme je sicer skromen pionir, v svojem pridobnem arealu, ki ga zvečine obkrožajo prerije, pa ga ogrožata vročina in suša, kar se kaže najprej v občutljivosti za raznovrstne škodljivce. Sicer je prilagojen okolju podobno kot duglazija in sekvoja in poleti dobro izkorišča obilno vlago, nabrano v tleh pozimi in spomladi.

Biološke lastnosti. V prirodnem arealu je pomlajevanje na odprtih površinah problematično, ker so mladice občutljive za sušo in vročino. V sklenjenih sestojih se ne pomlaja. Kasneje, v razvoju drogovnjaka, se slahka pojavi fiziološko sušenje, iste narave kot ga opazujemo v sedanjem času pri naši jelki. Ker je areal ekološko ekstremen, je genetična diferenciacija ostra, posebno na meji, kjer so na ekstremnih rastiščih populacije odporne. Ko zraste zahodni zeleni bor v sestoju v zrelo

drevo, stoji s svojimi ozkimi vretenastimi krošnjami zelo na gosto in dobro izkorišča prostor, obenem pa se naglo razvija v višino. Silna občutljivost za mehurjevko v vseh starostnih stopnjah narekuje skrajno previdnost pri njegovem vnašanju.

## Zahodni rdeči bor (Pinus ponderosa)

Areal tega bora je ogromen. Sega od višjih leg Kaskad v Kaliforniji od hrbtov obalne gorske verige daleč na vzhod v vzhodno Dakoto in Nebrasko, torej preko polovice širine severnoameriškega kontinenta; od severa na jug pa se razteza od južnega dela vzhodne Britanske Kolumbije v Texas, Novo Mehiko, Arizono in južno Kalifornijo. Na jugu areala in na skrajnem vzhodu raste v večjih višinah in tvori posebno temnoigličasto raso, v sredini areala začne pri približno 600 - 800 m kot svetloigličasta rasa. V zahodnem Oregonu pa ga najdemo tu in tam že pri 300 m, in to razmeroma blizu oceana.

Rastišča so talno paralela rastiščem zahodnega zelenega bora; edina pomembna razlika je v znatnejši sušnosti podnebja. Južna rasa, ki sega tudi v Dakoto in Nebrasko, prenese padavine, ki v letnem povprečju niso višje od 450 mm, in istočasno povprečno toploto 8°C; pri nižji toploti je padavin lahko še manj (pri 5,5° v Novi Mehiki 410 mm). V osrednji Kaliforniji začne pri 12° povprečne toplote, medtem ko je padavin 800 - 1100 mm. Skrajni upadki so na jugu ponekod izredno hudi (do -35°). V vzhodnem Oregonu uspeva na primer pri 400 mm in 9°C, absolutni toplotni upadek je tudi tu -35°. V severnem Idahu se njegov areal podnebno skoraj pokriva z arealom zahodnega zelenega bora, razlika je le v tem, da sega ob spodnji meji za malenkost niže, to je v nekoliko sušji pas, ob zgornji meji pa za okrog 200 m, tako da leži v temperaturah med 9,5 - 5°. V zahodni Montani prenaša toplotne minime -45° v hladnem in suhem podnebju. Toplotni

vrhunci so večinoma okrog 40°, dosežejo pa tudi 45°. Toplotni razpon je velik, obsega 18° med 11° v Kaliforniji in 29° v Utahu.

Zračna vlaga v njegovem arealu je zelo nizka, v povprečju se giblje med 50 - 65% in le na zahodu doseže ali nekoliko presežе 70%. Poleti je je komaj 30 - 45%.

Padavinski razpored je daleč na vzhod, celo še v zahodni Montani, sredozemski; najsušji poletni meseci dobe tam 20 - 30 mm dežja. V Wyomingu, vzhodni Montani, obeh Dakotah in v Nebraski pa so najbolj suhi meseci pozimi, najvlažnejši poleti, ko ima najvlažnejši mesec - junij - po 70 do 100 mm, zelo redko manj, ponekod pa tudi 125 mm dežja.

Vrsta in okolje ter biološke značilnosti. Zahodni rdeči bor je ona reliktna drevesna vrsta orjaške rasti, ki sega v razmerama najslabše rastiščne razmere, to se pravi daleč v notranjost severnoameriške celine. Zlasti velja to za območje zahodne Montane, kjer je poletna suša še izrazita, poleg nje pa se še uveljavljajo - ob zelo majhni količini padavin - celinske podnebne značilnosti. Zato je tudi ta utrjeni rdeči bor v času pomlajevanja občutljiv in ugodno reagira na zmanjšanje poletne sušne vročine, predvsem še seveda v svojem ekstremnem arealu. V sestoju stoji zaradi znatne potrebe po svetlobi na redko, tvoreč skupine, ki so značilnih starosti.

## Vahodni zeleni bor (Pinus strobus)

Velikanski areal takorekoč obkroža Velika jezera na meji Kanade in Združenih držav in s tem nakazuje, da je ta zeleni bor navezan na vlago, ki jo zagotavlja Atlantik z vzhoda in ogromne vodne površine omenjenih velikih in desettisočerih malih jezer. Sega pa tudi daleč na zahod preko Minnesote, Illinoisa, Indiane in Kentuckyja in na jug do Alabame, Georgije ter Južne Karoline, toda tu le v gorovju. V severnem zaledju Velikih jezer se razprostira v jugovzhodni Kanadi.

Rastišča so po prirodi razmeroma slaba, ker vzhodni zeleni bor v svojem arealu na boljših ne more tekmovati z zahodnimi listavci, med katere je primešan. Sam od sebe se uveljavlja le če so tla izrazito peščena, prodna ali plitva, kar je često slučaj v severnem delu areala, ki so ga ostružili ledeniki. Svojo veliko današnjo strnjeno razširjenost pa dolguje človeku, ki je s popolno ogolitvijo severovzhodnega ozemlja Amerike in ekstenzivnim poljedelstvom iztrošil tla ter ustvaril po opustitvi poljedelstva ugodne pogoje za razširitev skromnega svetloljubnega bora.

Razpon vseh podnebnih činiteljev v arealu vzhodnega zelenega bora je zelo velik. Tako je razpon nižinskih srednjih letnih temperatur od 15 - 3° že v mejah Združenih držav, skupaj s Kanado celo do 2°. Razpon med srednjo toploto najtoplejšega in najhladnejšega meseca znaša 18 - 36°, v absolutnih številkah znaša -17 do 25°. Skrajni toplotni upadki se gibljejo predvsem med -25 in -47°C.

Padavinski razpon se nahaja med 55o mm na severozahodnem koncu areala in pade v Kanadi celo na 5oo mm; doseže pa 2loo mm v južnih Apalačih. Pri razporedu padavin se pokaže zelo velika pestrost, saj so na primer absolutni padavinski upadki regionalno razmeščeni od septembra preko oktobra, novembra, decembra in januarja do februarja, na skrajnem severovzhodu Združenih držav pa so celo še v aprilu. Vendar je celotnemu arealu skupno to,da pozno spomladi in poleti v maju, juniju, juliju in avgustu nima suše, temveč pade tedaj skoraj povsod največ padavin, in sicer od 42 do 167 mm v najsušjem mesecu.

Zračna vlaga je v arealu vzhodnega zelenega bora zmerna, namreč v letnem povprečju 63 - 87%, poleti pa najmanj 59 - 88%, tako da je obakrat skoraj enaka.

Vrsta in okolje. Pri vzhodnem zelenem boru imamo opraviti z drevesno vrsto, ki je tudi orjaške rasti in kot taka reliktna;

to pa dolguje okoliščini, da je z jedrom svojega areala vsidrana na prehodu med subtropskim in zmernotoplim podnebjem, odkoder pošilja odraslke globlje v celino v manj ugodne okolne razmere. Zlasti poletna zračna vlaga je tista, ki daje skromnemu vzhodnemu zelenemu boru glavno ekološko ugodnost, ugodnost, ki je bila v toplejših (subtropskih) dobah še izrazitejša, a se je v znatni meri ohranila do danes. Spričo tega so talne razmere manj pomembne.

Biološke lastnosti. Vzhodni zeleni bor je za sušo v rani mladosti zelo občutljiv, zato ga v domovini skušajo pomlajati pod močnim zastorom predhodnega sestoja. V tej slabi lastnosti je v svojem arealu šibkejši od zahodnega zelenega bora in tudi od zelene duglazije. V mejah Jugoslavije sicer ta šibkost ne bi prišla do izraza drugje kot v Makedoniji in (če bi se našla dovolj globoka tla zanj)v Primorju izven Slovenije. Razume se, da je treba pri tem boru bolj kot pri vseh prej obravnavanih vrstah paziti na provenienco in strogo ločiti topleljubne ekotipe od srednje topleljubnih in hladnoljubnih vsaj po stopnjah srednje letne toplote od 15 - $12^0$ - $10^0$ - $7^0$ - $4^0$ - $2^0$.

## 5. OSNOVNI PRAKTIČNI ZAKLJUČKI

Podajam zgoščen pregled področij in njihovih ekoloških značilnosti, v katerih lahko pričakujemo zadovoljivo uspevanje hitrorastočih ameriških iglavcev.

Morebitna rastišča vednozelene sekvoje v Jugoslaviji.

V kolikor bi se dogodilo, da bi želeli preizkusiti vednozeleno sekvojo kot drevo s silno potenco tvorjenja lesne gmote, vendar z zmernim tekočim prirastkom, so ugodne podnebne možnosti za to samo izven Slovenije v ožjem Primorju, in sicer na celini južno od Biograda na moru, na otokih pa na Rabu in južje-

je, ker so glavni omejevalni činitelj najnižje zimske temperature. Razen teh povsem ustreza v Primorju tudi zračna vlaga in razpored padavin, pri čemer so poletne padavine celo mnogo ugodnejše (69 - 414 mm od VI-VIII). Po drugi strani pa je kolebanje temperatur med najtoplejšim in najhladnejšim mesecem ob Jadranu škodljivo, ker je mnogo večje, in sicer od 15.o - 22.5° - - tudi ob obali doseže 2o° - , ekrajne vročine pa se vzpno na 35 - 41° in so tako približno enake kalifornijskim (29 - 4o°C). Tudi učinka pogostne in silovite burje ne moremo dovolj poudariti.

Seveda še zlasti v Primorju ni primernih tal razen v dolinah na flišu, kjer pa prav gotovo spet ni najbolje, če je talna voda v mokri dobi više kot 1.5 m pod površino.

Rastišča zahodnega zelenega bora v Jugoslaviji.

Rastišča, ki bi se najbolj približevala prirodnim rastiščem, bi našli predvsem v silikatni Makedoniji v višinah med 1ooo - 15oo m. Pri tem ne smemo pozabiti, da tla ne smejo biti preplitva. Drugo primerno območje na primorski strani so Brkini. V notranjosti Jugoslavije so vsi peščenjakovi in prakamenински predeli za zahodni zeleni bor primerni, in sicer v Sloveniji do kakih 12oo m, proti jugu pa više do 15oo m. Spodnje meje bi se nahajale med 4oo - 8oo m, v Makedoniji še više

Rastišča zahodnega rdečega bora v Jugoslaviji.

Ko poudarjamo odpornost za sušo, bomo sicer takoj pomislili na možnost vnašanja zahodnega rdečega bora v Makedonijo, toda tu so ovire. V dolinskih legah, to je med 1oo - 7oo m nadmorske višine, je Makedonija pretopla in presuha za dobro uspevanje. Zato bi bilo potrebno iti više vsaj nekako do 9oo m in tu iskati primerna rastišča, ki bodo dala tem večji uspeh,

šim globlja bodo tla. V ostalem lahko računamo z dobrim uspehom povsod po Srbiji in drugih pičlo namočenih predelih, v Sloveniji tudi po Goriškem. Brez dvoma pa se bo zahodni rdeči bor obnesel tudi v podnebno boljšem okolju, ki ga v domovini ni navajen.

Rastišča vzhodnega zelenega bora v Jugoslaviji.

Podnebje notranje Jugoslavije povsem ustreza vzhodnemu zelenemu boru tako po toplotnih lastnostih in padavinskem razporedu. Pri tem ne more motiti okoliščina, da ima jugoslovanski padavinski razpored izrazit upadek v juliju, avgustu ali septembru, ker se ti upadki uveljavljajo tudi v delu prirodnega areala zelenega bora. Določene neskladnosti med vrsto in okoljem seveda vseeno nastajajo, kar se pri nas opazi po močni ogroženosti zaradi koreninske gnilobe, medtem ko je glavni in veliki problem v domovini borov rilčkar.

Rastišča obalne duglazije v Jugoslaviji.

Duglazijo so z uspehom uvedli v jugoslovanski prostor, za kar je posebno v Sloveniji mnogo primerov. Obnese se očitno v zelo različnem okolju, v Sloveniji od sredozemskega do panonskega območja, in sicer marsikje tako, da po priraščanju ne zaostaja mnogo za najboljšimi donežki v svoji domovini.

Če bi duglazijo hoteli na jugoslovanskih rastiščih omejiti klimatsko, bi sodila tudi ona predvsem v Primorje, pri tem pa bi njena južna meja bila nekje pri Šibeniku. Jedro tega območja bi bilo med Šibenikom in Senjem, kar se tiče razporeda padavin. Razume pa se, da tu prvič ni primernih tal, drugič nastopa najhujša burja, in tretjič so toplote vse leto tako visoke, da je celotna ekološka rezultanta enakovredna podhebno slabim rastiščem srednje obalne Kalifornije.

Preostane torej ozemlje, ki ima milejše temperature. Od tega poglejmo najprej tri območja, ki so prvemu najbolj po-

dobna. Makedonija ima znatne povprečne temperature, in sicer v nižinah med 12 - 14°, ter v velikem delu pravi sredozemski, drugod le nekoliko modificiran padavinski režim, ki bi douglaziji ustrezal. Isto velja za povprečne zimske temperature. Vendar so poletne temperature previsoke - razen ob velikih makedonskih jezerih - za 2 - 5°, in verjetno jih zmerne poletne količine padavin (najsušji meseci jih imajo od 15 - 35 mm, le malokje za malenkost več) ne izravnavajo, da bi bila rastišče res dobra za douglazijo.

Drugo podobno območje je Slovensko Primorje. Tu so povprečne temperature v glavnem med 13 - 9°, toplotne ekrajnosti med 41° in -19° (če izločimo hladnejšo Postojnsko kotlino). Najbolj suh poletni mesec dobi od 55 - 105 mm padavin, letne količine so med 800 in 1700 mm. Padavinski razpored je zelo podoben sredozemskemu. Vsi podnebni elementi so torej taki kot jih je želeti, pač pa je oceanski značaj podnebja v našem Primorju razmeroma šibak, kar se kaže v povprečnih letnih razponih temperature med 19 - 19.5° kot posledica razmeroma visokih poletnih temperatur (19 - 22°), manj nizkih zimskih temperatur (0 - 5°). V celoti je torej slovensko Primorje za douglazijo severne polovice areala zelo ugodno, omejiti se je pa seveda treba na flišne predele in globlja tla. Tu bo glavni omejevalni činitelj ravno prevelika razprostranjenost preplitvih tal, sicer bi se douglazija lahko povsod razmahnila kakor doma.

Tretje območje te vrste so nižji gorski predeli vzdolž Jadrana visoki do 1000 m, ki so še v pravem sredozemskem padavinskem režimu, vendar hladnejši. Tu lahko računamo s kompleksom rastiščnih pogojev, ki so prav tako ugodni kot v slovenskem Primorju, s to razliko, da je padavinski režim skoraj istoveten onemu vzdolž zahodne obale Severne Amerike. Izogniti se gx velja tu preplitvim tlem in burji preveč izpostavljenim položajem. Apnenčasta podlaga bo s svojo sušnostjo predstavljala nadaljnjo

oviro, ki jo bodo sicer do neke mere izravnala gostejša tla.

Če izvzamemo osrednji visokokraški pas, kjer vnašanje v zdrave in dobro rastoče jelovo-bukove gozdove ne bi bilo umestno pa tudi izvesti bi se ne dalo zaradi hudih mraznih skrajnosti, označimo ves ostali jugoslovanski prostor razen večjih višin s tem da mu v toplotnem pogledu priznamo povprečno vzporednost z razmerami v severnem delu prirodnega areala priobalne duglazije. Kar zadeva padavine, se velik del Jugoslavije nekako izenačuje s tem, da so področja bliže morju sicer bogatejša s celoletnimi padavinami, imajo pa apnenčasto podlago in močneje izraženo poletno sušo, čeprav so poletne padavine lahko zelo znatne. Notranji predeli imajo manjše in celo prav manjhne celoletne padavine, ki niso večje od onih v južnem delu prirodnega duglazijinega areala, zato pa nimajo izrazite poletne suše in zajemajo področja peščenjakovih in silikatnih kamenin. Tu je duglazija gost v povsem tujem okolju, ker jo drugačen razpored moti v vegetacijskem ritmu. K temu se v vzhodnih območjih države pridružuje vedno izrazitejša celinskost podnebja ne samo v padavinskem, ampak tudi v toplotnem oziru, kar pomeni vse večje in večje toplotne razpone, dosegajoče do 26°, kar je za priobalno duglazijo brez dvoma neugodno.

## Zaključne pripombe

Po vsem, kar sem uspel povedati v poročilu, želim povedati še nekaj stvari.

Izdelano poročilo je v oddani obliki klub mnogostranosti enostransko in sprčo pičlega razpoložljivega časa niti kot tako še ni povsem zaključeno. Za celovito zaključeno biološko-ekološko obravnavo hitrorastočih ameriških iglavcev pa bi sploh bila potrebna še nekatera važna poglavja, in sicer poglavje o talnih razmerah v arealih obravnavanih iglavcev, poglavje o priraetnih specifičnostih teh iglavcev v različnih podnebnih in talnih razmerah, in končno še poglavje o njihovih boleznih in škodljivcih. Da ta poglavja niso izdelana, je vzrok ne samo v pomanjkanju časa in sredstev, ampak tudi v tem, da bi jih bilo mogoče pripraviti samo s pomočjo ustrezne literature, ki je sicer še zelo pomanjkljiva, vendar bi že dali določeno osnovo, ki bi jo lahko postopno izpopolnjevali, ko bi bila objavljena nova dela. Žal pa bi tudi če bi možnosti bilo dovolj, ne mogel načenjati teh poglavij, ker do dneva izdelave poročila nisem prejel literature, ki sem jo v Združenih državah zbral. Vsekakor bi me obravnava omenjene dodatne snovi zelo zanimala in zato obžalujem, da zanjo nisem imel priložnosti.

Omeniti moram, da poročilu niso dodane klimatološke karte. Izdelal sem jih večje število za celotno ozemlje Jugoslavije in na vsaki je prikazan podrobno po en sam klimatski činitelj. Žal pa ni bilo mogoče razmnožiti pripravljenih originalov in kopije dodati posameznim kopijam poročila.

# R E P O R T

## about the forestry training in the USA

## April 30 th - September 27 th, 1963

By Milan Piskernik, Ljubljana
Inštitut za gozdno in lesno gospodarstvo Slovenije
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The report given here has the following disposition:

A. General statements.
   1. General remarks concerning the program and the training.
   2. Short review of the training.

B. Proffesional statements.
   3. Comparison of climatic features of Yugoslavia and the United States.
   4. Ecology of the studied fast growing American conifers.
   5. Basic practical conclusions.

C. Terminal remarks.

## 1. GENERAL REMARKS CONCERNING THE PROGRAM AND THE TRAINING

I wish to give the essential impressions gained during my travel through the USA accomplished in the connection with my forestry training in this country between the end of April and the end of September, 1963, as a member of a group, together with Ing. Miroslav Harapin from Zagreb, Croatia, and Ing. Mirko Ivanović from Kotor, Black Mountains.

To begin, at first with the history of the training, I have to say the following.

When I had the first contact with the AID Mission in Ljubljana in the summer of 1962 where the outlines of the training were discussed, I, like my two colleagues in Beograd, understood the situation in this sense:

a) the studies will be conducted presumably at two Universities or two Institutes, one of them situated in the West, and the other in the East of the USA;

b) the studies will be limited to the Douglas - Fir (in the West) and the Eastern White Pine (in the East);

c) each member of our group will have his own program according to his professional specialty (genetics - protection - sylviculture).

I expected the fulfilment of the program as I described it above because I was determined directly as a representative for the genetics program by an official written information given to the Institute for Forest and Wood economy of Slovenia by the Institution of the International Technical Assistance of Slovenia in Ljubljana. Then, I immediately started the preparatory studies within the planned program

and according to my expected future professional obligations, and, moreover, I extended my preparatory work on my own initiative by a basic analysis of the climatical conditions of Slovenia, and an extensive analysis of climatical conditions from the natural areas of the Douglas-Fir and the Eastern White Pine on the basis of data available in my country. I collected very many data and worked during all my out-of-office time from the begin of July 1962 until the end of May 1963 without interruption.

I did not receive the final detailed program until I arrived in Washington, and there, I was surprised enough when I stated that instead of a specialization at two institutions the program planned extensive travels and visits to numerous Forestry institutions most of them of one single week or less of durance, and that, in addition, no specific programs for the single participants were developed. That is why I was not, prepared to many aspects of the trayning, especially because several additional tree species were included the final program which circumstance extended the program considerably. But I also recognized immediately that the fixed program will, without any doubt, have many positive features because it will allow a broad insight into the whole complex of the professional practical and scientific activities in the forestry of the USA. Beside of this advantage, I was sure that contacts with many research workers and professional foresters will furnish an inexhaustible source of information for my future work in my country.

Therefore, I was completely contented with the changes I encountered. On the other hand, however, I was not contended at all with the circumstance that I was planned to start the studies in the USA 14 days later than my two colleagues for the only reason of my language proficiency, no

matter of the decision for this measure was initiated by the AID Mission, or the Yugoslav Administration of Technical Assistance or by both of them in agreement. My standpoint is based on the fact that my two colleagues had exactly the same intellectual possibilities as I had to master the English language beforehand since I did not learn it either at school or any course or finally with any help of any teacher. This arbitrary decision forced me because of the complete lack of a previous hearing and speaking practice to hard labor at the American Language Institute in Georgetown and to an urgent additional hearing program allowed on my personal asking. Then, during the program, instead of not being obliged to have the main linguistic obligations within the group, I was obliged by the situation to have these obligations. Finally, I was not as fortunate as to receive a certificate at the Language Institute stating my language abilities like my two colleagues received it, because my participatio at the courses did not cover three weeks which is the minimal durance required, and this is regrettable for me.

When the professional part of the program began, it soon became obvious that the intensity and the contents of the program will be high and rich because of the extraordinary zeal for working with us and because of the communication willingness of our instructors. Our group was able to follow every discussion as far as the language, and the professional contents were concerned. We had, of course, such difficulties during the first month increased by the greast heat and humidity in the southeastern states and because of the extremely low speaking of the majority of our instructors unusual in Yugoslavia.

During the first month of the training it became clear to all members of our group that the discontinuous com-

munication method will bring remarquable difficulties when the final report will come to be elaborated. We namely received all professional and scientific information through personal discussions which were either very short and condensed (we visited five or more research workers in a single day) or prolonged as to cover a whole day with one specialist mostly on an out-door observation trip. We therefore tried, at the University in Corvallis, Oregon to influence the situation to meet our most urgent needs of studying the available printed material to get concrete information we felt we need for the final report. But we stated that this was not economical and desirable either, and thus left the training program to take its planned course.

Taking the impressions of the professional part of the program as a whole, I am glad to say they were very good. The representatives of the institutions we visited used to accept our group mostly like is members were no foreigners, this was possible of course because we did not have language difficulties and because we showed a vivid interest in the details of the program. The representatives resp. instructors made, at every institution, efforts to give us best and the richest information possible. I, personally, have to point out the efforts of Dr. R. Silen, geneticist of the Forest Science Laboratory in Corvallis, Oregon, Prof. Dr. A. Berg, sylviculturist at the University of Oregon, Corvallis, Mr. W. Poiles, sylviculturist at the Boise Forest Research Unit in Boise, Idaho, and Mr. T. Mc Conkey, sylviculturist at the University of New Hampshire, Durham. May I say that I consider Mr. R. Silen as the appropriate specialist to come to Yugoslavia in the quality of an ICA or FAO expert who wille be able to give complex solutions of the problems expected to arise in the work with the conifers

introduced from North America.

Our group received an incredibly great number of publications dealing with all research aspects of the forest economy which are a reliable source of information necessary to find concrete data for a successful introduction of the American fast growing conifers.

The only drawback of the professional program was that our group visited numerous laboratories of the single research institutions instead of two or three where our group could do some practical work to become acquainted with methods, and equipment.

As for me personally, I was very happy to establish contacts with many research workers in forestry, and also met interest in some of them for my special field of work in the phytosociology, and ecology carried out, within the boundaries of Slovenia. Knowing that al - mpst all research workers whom we met during the training expressed their willingness to entertain professional contacts in future, I expect a constant potential source of scientific material is guaranteed. This is important because the research in the forestry of the United States enjoys a strong progressing development. Besides, I became acquainted with the differences existing between the Yugoslav and the American forestry as to the natural conditions and the research programs, and the economy.

I found a very friendly assistance, and a rich material in the States when I asked for both at two research institutions outside of the regular program on my own initiative; those institutions were the American Crop Institute in Silver Spring, Maryland, and the Federal Weathwr Bureau in Washington D.C. The Directors of both institutions, Mr. M.Y. Huttonson, and Dr.H.E. Landsberg, were extremely generous in giving their

help. My sincerest Thank to both! Mr. Landsberg arranged with the National Weather Records Center in Asheville, North Carolina, that a complete set of original climatological data was given to my disposal; I owe the sincerest gratitude for this important favor to the Director of the Center Mr. G.L. Barger.

Concluding, I wish to state that I decided, according to the fact that a concrete report can be elaborated only by limiting it to a narrower, more special frame, my report will deal only with one aspect of the problems concerning the introduction of the American conifers not yet introduced onto the Yugoslav territory as commercial timber species: the Redwood, the Western White Pine, and Ponderosa-Pine, and the understanding of the situation of already introduced American conifers: the Douglas-Fir, and the Eastern White Pine, that is with the ecological and especially climatical complex of problems.

I feel sincerely obliged to the people of the Institute of Forest and Wood Economy of Slovenia in Ljubljana who first, despite of several candidates supported and/then approved my appliance: these gentlemen were Ing. Miran Brinar, Ing. Jože Miklavžič and the Director of the Institute ing. Bogdan Žagar. Then, the same sincere obligation I feel to the whole working collective of the Institute who did their best to make the realisation of the training financialy possible. Furthermore additional means were allowed to bring the report to a more detailed form; and I have to thank Ing. Bogoslav Žagar for his scrupulus efforts of calculating, converting, and arranging the great quantity of data prepared by myself, the work of both of us being made possible by this special allowance, partly gained however, from the means allotted originally to my own regular research projects.

Finally, here is the right place to express my sincerest thanks to both United States, and the Yugoslav Technical Assistance institutions. And, the last, but the most meritorious and engaged, are the professional and non - professional people of alle forestry institutions visited by our group to whom I have to express the most sincere gratitude for their work concerning the organization, and the fulfilment of the program. I will mention personally only Mr. R.C. Fulcher from the FAS - FTD of the USDA, but I am thinking of alle persons having given their time, and knowledge to instruct and to help our group during the five months of training, and of all as well, who opened their homes to accept us as welcome guests all over the West, and the East.

Ljubljana, 1o. junija 1964

M. Piskernik

2. SHORT REVIEW OF THE TRAINING.

Here I did not include the part of the program accomplished at the USDA and at the American Language Institute, but only its strictly professional part.

1. North Carolina State College, Raleigh. May 28 th - 29 th. Prof. Dr. Maki, pedalogist, made our group acquainted with the organisation and the research program of the Forestry College of the Univereity, prepared contacts and short discussions with Dr. Perry, physiologist, and chief of the extension service Mr. Gray.

   Prof. Dr. Zobel, geneticist, took the group to the southern areas to introduce us to the southern dendroflora, to explain the genetic problems concerning the Loblolly-Pine (Pinus taeda) and the nursery practices concerning the same Pine species at Lumberton.

2. Hydrological Research Laboratory in Coweeta, North Carolina. May 31 st.
   Instructed by the Director Dr. Hewlett, Mr. Swift and Mr. Hibbert we the research activity whlich is conducted to deal with all aspects of erosion and pollution of the water reserved for use in settled areas.

3. Tennessee Valley Authority (TVA) Research Station, Norris, Tennessee. June 5 th - 14 th.
   Contacts with the research workers of the Station Messrs. Bean, Doub, Dr. Zarger, Dr. Foster, Ellertsen, and Lehto. Our program included the observation. of plantations consisting of conifers (Pines) and broadleaved tree species (Tupil tree) on abandoned agricultural lands; repeated visits to the nursery of the Station, discussions

about the practices and the plantation of soperior trees of Loblolly Pine; visit to the arboretum of most important American Pine Species; finally the observation of a strip mine reclamation area reforested by Pinus echinata and Populus deltoides in West Virginia.

4. Pacific Southwestern Forest and Range Experiment Station, Berkeley, California. June 17 th - 18 th.
Discussions with the research workers of the station Messrs. Ericksen, Woolfolk, Gleason, Hubbert, Wilson, and Stevenson of problems concerning erosion, fires, and water management specific for California.

5 a. Western Genetics Institute, Placerville, California. June 19 th - 24 th.
Professional contacts with the Director Dr. Righter and entomologist Smith. Cooperation at the crossing - work concerning a number of Californian Pine species in the Sierra Nevada. Observation of the Pine Arboretum where the majority of the Pine species of the world are collected. Visit to Giant Sequoias in the Calaveras Big Tree Park.

b. Forest Service Headquarters, Placerville, California. June 25 th - 26 th.
Observation of plantations of different Pine species from the Pacific area; visit to the nursery, and to the Pine seed orchard.

6. Six Rivers National Forest Headquarters, Eureka, California. July 1 st - 5 th.
Trips through the Douglas-Fir area in the Smith River Basin, and discussions of management, and exploitation methods with Mr. Brown. Observation of management and exploitation practices in the Klamath Redwood Experimen-

tal Forest with Mr. Boe.

7. Oregon State University, Corvallis. July 8 th - 16 th.
Observation of Douglas-Fir Forests in different places in the Cascades under instruction of Prof. Dr. Berg and Prof. Dr. Hermann, with discussions of sylvicultural research work conducted in these forests; observation of soils in the Douglas-Fir forests in the Coastal Range with Mr. Youngburg; contact with the entomologist Prof. Dr. Rudinsky; discussions with the phytopathologist Dr. Wright, geneticist Mr. Ching, and physiologist Dr. Lavender. Observation of experimental plantations of the Scrub Pine in Eastern Oregon with Prof. Kudrjavcev.

b. Forest Science Laboratory, Corvallis, Oregon. July 17th -19th.
Discussions of genetical and sylvicultural problems concerning the Douglas-Fir with Dr. Silen, with travels through the area; visit to the Wind River Arboretum.

8. Pacific Northwestern Forest and Range Experiment Station, Portland, Oregon. July 22 nd - 23 rd.
Contact with the Director of the Station Mr. Briegleb, discussion with the ecologist Mr. Trappe of the ecology of different varieties of the Douglas-Fir, and with the pedologist Mr. Tarrant of the influence on the soil of the clear-cutting, and burning practices carried out in the Douglas-Fir forests.

9. Weyerhaeuser Company Research Laboratory, Centralia, Washington. July 24 th - 26 th.
Discussions with the physiologist Mr. Redinske, sylviculturist Mr. Staebler, dendrometrist Mr. King and pedologist Mr. Steinbrenner; observation of plantations and forests of Douglas-Fir on the tree-farms of the Company.

10. Brauch of the Pacific Northwestern Forest and Range Experiment Station, Olympia, Washington. July 29 th - 31 st.
Discussion of sylvicultural aspects of the Douglas-Fir forests on a trip with Mr. Reukema; discussion of application of chemicals for prevention of damage caused by game, with Dr. Radwan. Observation of forests of different tree species along the cross-section Olympia - Pacific coast under the instruction of the Director of the Branch Mr. Warden.

11. University of Washington, Seattle, Washington. August 1 st - 2 nd.
Discussion with the physiologist Dr. Walker of laboratory experiments aimed at controlling the assimilation processes; observation of electronic measurements of the assimilation analyses on seedlings and trees of Douglas-Fir under instruction of Dr. Scott.

12. Forest Research Laboratory, Moscow, Idaho. August 5 th - 23 rd.
Review of the Laboratorys genetics research activities, and program, given by Dr. Bingham; instruction given by Mr. Stage about the correlation of growth rate and climate; visit to the seed orchard of the Western White Pine in the Kaniksu National Forest under instruction of Mr. Wise and Mr. Hoff; observation of laboratories for genetics, and seed preparation work; discussion of the biochemical aspect of the resistance of the Western White Pine to blister-rust with Mr. Hanover; observation of forests of the Western White Pine in one of the Experimental Forests of the Research Laboratory with Dr. Deitschman; observation of pests in the Western White Pine forests with Mr. Johnson: observation of fungus diseases in these forests with Dr. Miller; observa-

tion of damage caused by various species of mistletoe on different tree species in the Priest River National Forest with Dr. Wicker; instruction concerning the physiology of the blister-rust on the Western White Pine (Messrs. Collins and Königs); typological observation of forests in the Clearwater River Basin and of plantations of the Western White Pine in Musselshell, and dendrometrical practices in the forests of this Pine with Mr. Boyd.

13a. Boise Research Unit, Boise, Idaho. August 26 th - 28 th.
Observation of problems of forest management and sylviculture in the forests of the Ponderosa-Pine, and of problems encountered in the plantations of this species, with Mr. Foiles.

b. Boise National Forest Headquarters, Boise, Idaho. August 29 th - 30 th.
Visit to the nursery of Ponderosa-Pine, vegetatively stabilised watershed area near Boise with Mr. Rozynek, and to the reforestation area with Mr. Doupey.

14a. Forest Products Laboratory, Madison, Wisconsin. September 3 rd - 4 th.
Discussions of current research programs: concerning the wood properties with Mr. Pillow and Mr. Pronin, concerning stem growth with MR3. Smith, and wood-destructing pests with Mr. Esenther.

b. University of Wisconsin, Madison. September 5 th - 6 th.
Discussions with the members of the Extension Service Mr. Peterson and Mr. Cunningham, and the Professor of physiology Dr. Kozlowski.

15. University of New Hampshire, Durham. September 9th - 13th.
Observation of the Eastern White Pine forests and discussions of their sylvicultural problems with Mr. Mc Conkey and Mr. Graber; visit to the Hopkins Memorial Forest in Williamstown, Massachussets with the geneticist Dr. Santamour and Mr. Cun-

ningham.

16a. Forest Insects and Diseases Laboratory, New Haven, Connecticut. September 16th - 18th.
Discussion with Mr. Waters of the organisation of the Laboratory, and with the phytopathologist Mr. Mook of the fungus diseases affecting the Eastern White Pine. Review of the Hopkins entomological collection; visit to the Blue Spruce nursery in Pachung with Mr. O Dell.

b. Yale University, New Haven. September 19th.
Discussions with: Dean Dr. Garrat of the organization of the University, Prof. Dr. Lutz of typological, and ecological problems; Prof. Dr. Smith of the sylvicultural practices, Prof. Dr. Hensen of entomological problems, Prof. Dr. Cowling of phytopathological problems, and with Prof. Dr. Mergen of genetics research work.

## 4. ECOLOGY OF THE STUDIED FAST GROWING AMERICAN CONIFERS

### The Redwood (Sequoia sempervirens).

The natural area of the Redwood extends like a belt along the shore of the Pacific Ocean following the coast of Central, and Northern California. In its southern part, this belt is extremely narrow and disrupted in isolated spots, whereas in the northern part, it gains a width of about 2o km consisting of extensive pure forests with up to 9o % Redwood. Single trees, and groups thrive some more kilometers farther east located in valleys and on western slopes, being included in the forests of the coastal Douglas Fir. The altitudinal limit is at about 5oo m a. s.

The Sites of the Redwood are of the highest quality imaginable, being, at the same time, not imaginable in Europe.

The soil, always silicions, for instance, has regularly a depth of several meters which is even true, with no frequent exceptions, for the main and side ridges, and pronounced slopes. It seems to be no rarity to find soils 5 meters deep no matter, almost, what the nature of the relief may be. As a matter of fact, not the complete soil profile is biotized and the greater part of it is minerogeneous; the roots don't penetrade deeper than necessary to balance the 7o - 1oo meters of height/of the tree. But, this soil possesses an inexhaustible storing capacity for moisture whlich is the most important growth factor since the soil, having a sandy - clayey texture, is simultaneously thick and loose enough to allow a very satisfactory rising. of the moisture of the deeper layers where the water stays accumulated, or, if the ground is level or very gentley sloping, it keeps stagnating immediately over the parent rock.

The warmith of the climate must be estimated as being very favorable. The average yearly temperatures keep a level betveen

15 $^{o}$ and 11$^{o}$ C on the coast and don't fall essentially under 9$^{o}$ at the upper altitudinal limit. The amplitude betveen the average mean temperature of the warmest and the coolest months makes but 5 - 1o$^{o}$, white those months develop average temperatures of 15 - 2o$^{o}$ g respectively 8 - 12$^{o}$C. The winter extremes don't go under -1o$^{o}$C.

It is astonishing, however, that the atmospheric moisture and humidity are less than medium. The precipitations of the year in the south are only about 6oo mm, and in the northern 12oo mm at the most. More than that, there is practically no rain in the summer, which is particularly true for the months of July and August, the whole summer period getting nowhere - even not in the northern part of the area - more than, 3oo mm of rain.

The air humidity too is scarce during the vegetatiob period despite of the immediate vicinity of the Ocean and of data showing a frequency of fog occurrence both coupled with very moderate temperatures. During the winter months it rises to 76 - 87 %, but the year's average is only 55 - 75 %. In the summer, it is not abundant either but it nevertheless reaches the average level of the year or even surpasses it to a certain extent (6o - 7o %).

The species and the environment. The Redwood develops gigantic stems and is able to reach an age of several thousand years; it is a relic from the past ages conserved by the means of a free moving along the shore of the Ocean during the periods of heavier climatical changes.

It possesses a special vitality expressing itself not only by the extreme longevity but also in the capability to build shoots from age-old stumps even more abundant than the European

Beech does, and to live further assimilating strough secondary branches when the crown is completely removed by storm and small shrubs grow already in the wounds. The Redwood is able to take profit of its vital power in the existing favorable warmth which allows several species of Eucalypts to be grown within the area. It is supported just by the drought of two or more summer months, and the low air humitidy which both make the advantages of an extremely favorable soil depth, the moisture of the lower soil layers, and the good capillaristy of the soil available to the tree.

The very same climatic conditions which, along with the powerful leveling influence of the Ocean, were responsible to assure zhe survival of the Redwood on its growing places fixed for the same individual trees for thousand or more years thus exposed to all environmental changes and countless wildfires, created the present unmatchend soils of the Redwood area, being alwys far from the destructive influences of the Ice Age. It is the favorable warmth wlich allows a biologieal activity also during wintertime when the temperatures between 8 and 12°C (equal to the years average in Lower Carniola and in the submediterranean Vipava valley in Slovenia) and the concentration of the precipitations in the fall make it abundant. The rising moisture of the soil during the summer is abundant again because of the abundance of precipitation in the spring; in this way the surface of the soil is constantly furnished with water, and consequently covered with hygrophilous plants. Under such conditions the age-old continuous disintegration of the sandy, silicious parent rock led to the present remarkable depth of the soil; this process was left undisturbed because of the very good porosity of the soil, but also because of the century-old continuous cover of the soil surface by very densely growing giant

trees preventing every erosion phenomenon.

Biological characteristics. The regeneration is assured, on the natural sites, by a sufficient quantity of light; this again is furnished if the closing of the trees left after cutting is about 50 % at the most.

The Coastal Douglas-Fir (Pseudotsuga Douglasii viridis).

The natural area of the Green Douglas-Fir has no sharp limits because this Douglas-Fir represents only a race or a variety within the Douglas-Fir as a species. The American foresters back the opinion that it is not necessary to distinguish the three known varieties of this species after their morphological characteristics, but that, on the contrary, there is enough reason to distinguish regional strains of it. This standpoint came about because within those strains, and especially within the coastal strain, different forms are regularly found that is to say the green, the blue, and the gray together. Looking from the foresters point of view these forms growing side by side of each other are practically identical especially as far as the growth rate is in questionn but also in other characteristics, just because they are not genetically isolated-what cannot be said for the complex of the regional races of the Douglas-Fir as a whole - thus showing all imaginable morphological transitions between each other evident, first of all, by the color of needles. Therefore, two regional strains of the Douglas-Fir have the main significance: the coastal Douglas-Fir, and the intermountain Douglas-Fir; no definite limits between both have been determinated so far.

We may consider the Douglas-Fir of the Cascades being derived from the coastal form which is doubtless more correct for the coastal side of the Cascades than it is for their inland side where a certain trend of transition to the intermountain form may be stated. Carrying out a detailed regional horizontal differentiation we might be able to isolate several zonal forms accompanying the gradual changing of the climate from the maritime to the continental one.

The American foresters themselves recognize, beyond that, a considerable number of small-regional ecological races of the Douglas-Fir important as practically homogeneous seed-sources. Moreover, they nevertheless make efforts to intensify the morphological analysis of the main forms of the Douglas-Fir by studying the morphology of their root-systems.

It is clear that the coastal Douglas-Fir itself is not homogeneous in any sense, building, for this reason, merely yn imaginary unit by the circumstance that it grows in relatively most favorable climatic conditions of the Douglas-Fir natural area as a whole. Reaching from the area of the protrudine xerophilous Oaks in the south where it is intermingled with them, over the area of the Redwood and its own pure forests farther northward to Alaska up to the 55th parallel, the Douglas-Fir encompasses very different ecotypes which can best be recognized, and treated on the basis of a climatic analysis.

The Douglas-Fir contacts the Pacific coast north of San Francisco in the south, coming from the mountains of Southern California where it stays north of the 37th parallel. It develops its optimum in western Washington(in the southern part of the Olympic Peninsula) in some isolated small areas between 100 - 700 m a.s., and in the southern part of British Columbia.

The sites show a fairly homogeneous nature, as far as the physical soil qualities are concerned, since the coastal part of the Douglas-Fir area encompasses only silicious, and basic eruptive parent rocks. The moisture amplitude however is considerable considering that the best sites are moist all the year rounde while other still good are dry in the surface layers of the soil during the summer. Both site types are characterized by certain plant species, like the third type which is ecologically intermediate and, having a fresh soil surface in the summer, shows an abundant moss cover consisting of the same species that are found in European fresh Spruce forests and plantations as well as in Scotch Pine forests, on sandstones and silicions rocks. The depth of the soil is considerable everywhere, and here again depths of several meters are characteristical. The texture of the is sandy-clayey, often possessing a marked sandy component, and this gives an optimal porosity to them.

The climatic features of the natural area of the coastal Douglas-Fir are very favorable. Yearly averages of temperature near the coast lay between 15° and 9°C in the United States, in Canada down to 7°. The year's amplitude there is 5 - 2o°, retaining this level in the adjacent mountains as well. The monthly temperatures of the summer are 13 - 2o°, those of the winter 8 to - 1° near the coast and down to - 4° at 1ooo m a.s.; the absolute warmth maxima reach 32 - 42°, the absolute cold minima -7° to -25° near the coast and as much as -27° at 1ooo m.

The precipitation amplitude is broad, it goes from 6oo mm in the south to 25oo mm in the north. There is also a remarquable difference in the regional amounts of the summer precipitations. They are often completely missing in the so-

uth, in the north within the United States they reach 50, and in Canada as much as 110 mm even during the driest summer month. The distributism throughout the year is "mediterranean" like with the Redwood because two summer months are the absolutely driest months of the whole year.

The range of the air humidity is very important since it makes 30% on the yearly average between 55% in the south and 85% in the north. Here again the summer humidity is favorable so that even the driest summer month possesses a higher humidity level than the year as a whole, from 60 - 86%. But, taking shorter periods into account, the summer humidity may be also low, and the driest summer month may have as little as 40% of it.

The species and the environment. The coastal Douglas-Fir is a fast growing tree, but we have to hold in mind that the range of its growth rate is so great as to be equal, in the South, to the European Fir or Spruce on poorer lowland sites, whereas, in the north, on the best sites and also on rather steep northern slopes, the growth may even be ten times greater. On the poorer sites which are, first of all, found on southern aspects regardless a greater depth of the soil, the Douglas-Fir thrives about as well as the European Fir in the drier areas of the Slovene High Karst for instance which is especially true for the eastern border of the High Karst mountain ranges.

The good growth of the coastal Douglas-Fir may be derived from the favorable climate and a similar history of evolution as encounteres with the Redwood. The difference is to be sought in the biological superiority of the Redwood

since because of it the Douglas-Fir was able to seize and hold only somewhat poorer sites both as far as the climate and as far as the soil are concerned.

Biological characteristics. It is necessary to know that, within its natural area the Douglas-Fir has marked light requirements and does not regenerate under cover. This rule has some exceptions too, however. Being namely very sensitive to heat extremes in the tender seedling stage - it is especially the coastal race which suffers - a light cover is necessary on the southern aspects furnished either by sparsely standing trees or also bushes, stumps, laying logs or protruding parts of the microrelief. The Douglas-Fir is simultaneously heliophilous and a pioner, and is able to establish a copious regeneration at once on the road banks, and on clear - cut surfaces where the salvaging of big logs and burning of the slash cause innumerable wounds on the bare soil surface. The European forester may find this treatment incorrect, but it is nothing else but a rough imitation of the natural events which made it possible to the Douglas-Fir to persist and to becild immense forests by never ending wildfires reinforced of course by burnings practised by the Indian tribes. Given that the erosion on burned surfaces was never able to affect the soil seriously because of its porosity, the soil gained its previous good condition under the new stand quickly and then became even gradually richer and more productive.

The Western White Pine (Pinus monticola).

The natural area of the Western White Pine is relatively restricted especially if we compare it with the much more extensive area of the Douglas-Fir as a species. It does not

reach the coast of the Pacific staying, in the north, above 900 - 1000 m a. s. in the Cascades as admixture; the farther to the south, the greater its vertical distance from the Ocean, and it is found, in the northwest of California, only above 1500 m, in Central California above 2200 m. It does not exist in Southern California. All these places allow only single trees and groups to grow; forests of the Western White Pine are developed as far east as Northern Idaho in altitudes between 650 - 1500 m. From there, the Pine penetrates into the southeastern part of British Columbia, but has, in the United States, a sharp limit following the Clearwater River between Northern and Southern Idaho. The easternmost Western White Pine comes into West Montana north of the 47th parallel.

The sites within the natural area are very heterogeneous looking at at soils because the area was partly eroded by ice. Nevertheless, the soils are not very shallow except on ridges thand to the intensive root activity of this giant Pine. The texture of the soil, silicious again, is sandy-clayey, the soil, therefore, is well aerated, and capillary.

While the edges of the natural area, in the west, show climatically common features with the area of the coastal Douglas-Fir, some special climatic features are present in the central part of the area. The mean annual temperature is, on the average, 9° at the most, and 4° at the least. The winters ar cold, the coldest month is not warmer than -2 °C. The difference between the warmest and coldest months is 21-23°. The absolute temperature minima are -25 to -37°, the absolute maxima 35 - 41°, maybe even up to 45° (in West Montana). The precipitations are scarce and have a narrow amplitude (between 500 and 900 mm). The air humidity for which no direct

data are available must be low, and fairly homogeneous in the central part of the area; we may estimate its level with some 60% on the year's average and with some 40% in the driest summer month.

Common to the Redwood, to the coastal Douglas-Fir, and to the Western White pine is the summer drought as a consequence of as little as 15 - 30 mm of rain in the driest month, and scarcely more in British Columbia.

The species and the environment. The narrow ecological amplitude of the Western White Pine is connected with the relic character of this Pine like this is the even more evident case with the Redwood. From the Yugoslav point of view, the Western White Pine is a modest pioneer, but in its natural area surrounded prevalently by natural prairies, it is menaced by heat, and drought. Thus weakened, it looses the resistence against its many pests, and diseases. Besides, however, it is adapted to the drawbacks of the environment and is able to use, during the summer, the abundant moisture stored in the soil during the winter, and the spring.

Biological characteristics. Within the limits of the natural area the regeneration is problematic on open surfaces because the seedlings are susceptible to drought and heat. In fairly closed stands the regeneration is not possible. Later, in the pole-stage, the physiological dying-back often occurs which is of the same nature as observated with the European Fir. Because of the ecological extremness of the natural area, the genetic differentiation is sharp, especially on the borders where, on extreme sites, hardy populations have developed. Before the Western White Pine is fully grown, its conic crowns

close very densely using the space very economically and making a good height growth. The extreme sensitivity of the Pine to blister-rust requires the extreme cantiousness as to the introduction.

## The Ponderosa-Pine (Pinus ponderosa).

The natural area of the Ponderosa-Pine is tremendous. It extends from the higher altitudes of the Cascades, and in California from the ridges of the Coastal Range far to the east into eastern Dakota and Nebraska, as far as over half of the cross - section of the North-American continent. From north to south, it encompasses the space between the southern part of British Columbia and Texas, New Mexico, Arizona, and southern California. In the south as well as in the extreme east of the area it grows only in higher altitudes as a dark-needle form, whereas, in the rest of the area, it is present from 600 - 800 m on as a light-needle form. In western Oregon, it is found at 300 m already not very far g from the Ocean.

The sites have soils which are parallel to the soils of Western White Pine. Thus, the only important ecological difference between both pines concerns the remarkable dryness of the climate almost all over the area of the Ponderosa-Pine. The southern form extending also into Dakota and Nebraska, is able to stand a precipitation quantity of not more than 450 mm per year combined with an average temperature od $8^{0}$C. If the temperature is lower, the precipitations may be even scarcer (at $5.5^{0}$ in New Mexico, 410 mm for instance). In central California, the lower limit begins at $12^{0}$ and 800 - 1200 mm of precipitation. Here, the cold extremes may be extraordi-

narily severe (down to - 35°C). In eastern Oregon the Ponderosa-Pine grows getting 400 mm of precipitations at 9°C, and experiencing the same severe colds (-35°). In northern Idaho, the area of the Ponderosa Pine coincides climatically with the area of the Western White Pine except that it descends somewhat lower which means a drier warmer climate, and that it rises for about 200 m less high up, thus growing in average temperatures between 9.5 and 5°C. In western Montana, it has to stand minima of -45° in a cool and dry climate. There, the maxima mostly reach some 40°, but also 45°C. The average yearly amplitude is different, 11° only in California and 29° in Utah. The air humidity of the area is very scarce with all-year averages of 50 - 65%, in the west up to 70%. During the summer, the level is 30 - 45%.

Even as far east as western Montana, the precipitation regime is mediterranean; there, the driest summer months receive 20 - 30 mm of rain. In Wyoming, eastern Montana, both Dakotas and in Nebraska, the winter months are the driest and the summer months the wettest ones so that June, having the maximum rainfall of the year gets 70 - 100 mm, very rarely less, but sometimes up to 125 mm.

The species, the environment and the biological characteristics.

The Ponderosa-Pine is that relic tree species of gigantic dimensions which penetrates into relatively worsest ecological conditions that is far into the heart of the mainland. The most critical conditions within the area are those in western Montana where the mediterranean summer drought is still marked while some continental features come to effect already, such as a very small total yearly precipitation quantity, and extreme colds. As a consequence, even this Pine is not immune during its regeneration process and rewards every measure aimed at a reduction

of the summer heat and drought pressure. It builds unevenaged stands where the canopy is open and where groups of approximately evenaged trees grow together.

The Eastern White Pine (Pinus strobus).

The natural area of the Eastern White Pine is very vast; it surrounds, so to say the Great Lakes situated on the boundary between Canada and the United States. This circumstance may be understood in the sense that the Eastern White Pine needs the humidity furnished by the Atlantic Ocean from the east, and by the gigantic water surfaces of the big and thousands and thousands of small lakes in the center, and the west. From the Great Lakes region the area extends through Minnesota, Illinois, Indiana and Kentucky southward to Alabama, Georgia, and South Carolina, limited to the mountains, however.

The sites are relatively poor because the Eastern White Pine does not possess the ability to compete with the broadleaved trees on better ones. Representing only an admixed component in those broadleaved forests, it succeeds to take over only if the soil is markedly sandy, gravelly, or shallow. Such conditions are often realized in the northern part of the area which bears the consequences of the Ice Age. It was the man, however, who gave the Eastern White Pine the present extension by exterminating the original forest cover of the Northeast completely and abusing the soils by extensive agricultural methods afterwards, then finally by leaving those exhausted regions and allowing the forest and especially the light-demandind species to come back again and conquer the vast open species.

The span of all climatic factors within the area of the Eastern White Pine is very broad. The average yearly temperatu-

res in the lowlands are 15 to 3° in the United States, to 2° if Canada is included. The temperature difference between the warmest and coldest months is 18 - 36°, or in real extreme figures -17 to 25°. The cold extremes are mainly between -25° and -47°.

The amplitude of the precipitation quantity lays between 550 mm in the northwest of the area and even 500 mm in Canada, and 2100 mm in the Appalachians. The precipitation distribution is very varied, since the lowest quantities change their position in the year regionally showing up either in September, or in October, November, December, January or February, or even as late as April in the extreme Northeast of the United States. Nevertheless, the whole area has no drought in late spring and in summer from May to August; on the contrary, mostly the rain is most abundant during this period; thus, the driest summer month receives from 42 to 167 mm of rain.

The air humidity of the Eastern White Pine area is moderate; the averages of the year are regionally different amounting to 63 - 87%; the same is the summer level with 59 - 88%.

The species and the environment. The Eastern White Pine too is a giant tree species and therefore a relic; this because the center of its area lays in a transition belt between the subtropical and moderate climates, thus enjoying good migration possibilites in northern and southern directions. The favorable air humidity of the summer may be quoted as the deciding ecological advantage for this modest Pine species. This advantage was greater during the past warm (subtropical) climatic periods but has always been effective up to the present time. Compared with its importance, the soil nature and changes are to be placed into the second plan.

Biological characteristics. The Eastern White Pine is very susceptible to drought in the earliest development stages, that is why the regeneration is tried under the untouched canopies of the preceding stand. This weakness is, in the natural area greater than it is with the Western White Pine or even with the coastal Douglas-Fir. In Jugoslavia, it may not express itself except in Macedonia and in the Coastland of Croatia and of the Black Mountains. There is, of course, the obvious necessity to pay due attention to the single provenances and distinguish clearly the thermophilous ecotypes from the cold-resistant ones at least by the steps of the mean yearly temperatures of 15 - 12-10 - 7 - 4 - 2°C.

## 5. BASIC PRACTICAL CONCLUSIONS.

I wish to give a condensed survey of the areas and their ecological characteristics where the single American conifers can be expected to thrive satisfactory when introduced.

Potential growing areas for the Redwood in Yugoslavia.

If the possibility of growing Redwood in Yugoslavia should come to discussion, on the basis of checking its enormous capability to build the wood substance despite a moderate current rate of growth, only outside of Slovenia favorable conditions may be supposed to be found. Such conditions will be limited to the Adriatic littoral in the narrowest sense of the word, and will in the North, on the mainland, not surpass Biograd na moru, but will include Rab as far as the Adriatic islands are concerned. The northern limit has to follow the border line between cold extremes of less and more than -10°C. If this most important requirement is met, the rest of the climatic factors do'nt influence the siutability of the warmer coastal regions seriously, the air humidity and the precipitation being adequate and the quantity of the summer precipitations (June - August) even much more favorable (69 - 414 mm). However, the average temperature oscillation between the warmest and the coolest months of the year must be considered somewhat detrimental since it is much greater amounting to 15.0 - 22.5°C and reaching 20°C even on the coast itself, while the extreme heats - 34 to 41° - correspond well to the Californian ones -29 to 40°. In addition to this draw back, we have to mention and to stress the bad effect of the frequent and heavy northeaster, the bora.

As a matter of fact, there exist no favorable soils fot the Redwood in the Littoral except perhaps in the flysch valleys

where, certainly, it can't be propitious if the ground water level during the wet periods stays higher than 1.5 m below the surface.

Potetntial growing areas for the coastal Douglas-Fir in Yugoslavia.

The Douglas-Fir has been successfully introduced into the Yugoslav territory; proves thereof are especially frequent in Slovenia. The species develops well in very different environmental conditions from the mediterranean to the pannonic Slovenia for instance, and in some places it grows almost as good as it does in its best original surroundings.

Would we delimit the area in Yugoslavia climatically most suitable to the coastal Douglas-Fir, we would find it in the Adriatic Littoral again, and the southern border would have to be at Šibenik. From there up to Senj, there exists a precipitation distribution which is almost identical with the original one along the Pacific Ocean. Unfortunately, suitable soil could hardly be found, furthermore the strongest bora is ravaging here, and finally strough all the year the temperatures are so high that the ecology as a complex equals the bad climatical conditions near the coast of the central California.

For this reason, we have to consider the areas having a milder climate. First, let us characterize three of them which are similar to the mediterranean one already described.

Macedonia shows considerable average temperatures, as high as 12 - 14°C in the plains, and has prevalently a genuine mediterranean, partly somewhat modified precipitation regime surely suitable to the requirements of the Douglas-Fir. The same may be said for the average temperatures of the winter months. But the summer temperatures are to high for 2 - 5°C except in the vicinity of the great Macedonian lakes to be overcome by the

moderate precipitations in the summer - mostly 15 - 35 mm during the driest month, and to make good sites for the Douglas-Fir.

Another similar region to be discussed is the Slovene Coastland. Here the average temperatures of the year are between 13 - 9°, temperature extremes between 41 and -19° (the cool depression of Postojna excluded). The driest summer month receives 55 - 105 mm of rain, the yearly quantities are 800 - 1700 mm. The precipitation distribution is very similar to the mediterranean type. All those climatic features are able to meet the requirement of the Douglas-Fir; the oceanity of the climate, however, is relatively weak if we express it in the terms of the average difference between the temperatures of the warmest and coldest months (19 - 19.5°). It results rather from the high summer temperatures (19 - 22°) than from low winter temperatures (0 - 5°). As a whole, the Slovene Coastland is very favorable to the Douglas-Fir if the condition of restricting it to Flysch areas and to deeper soils is respected. The main difficulty to get very good results will be the general prevalence of shallow soils, otherwise the Douglas-Fir could develop everywhere like in the native country.

The third area of this kind extends in the direction of the Adriatic coast in the lower mountain ranges up to an altitude of 1000 m; there the precipitation regime is strictly mediterranean, whereas the warmth is moderate. The shallow soils will have to be avoided and the sites seriously exposed to the bora as well. The dry limestone ground will also be a hindrance but the thicker soil texture will make this good to a certain extent.

The central part of the High Karst ranges, covered by healthy and well-growing mixed Fir and Beech forests does not need any introduction of Douglas-Fir, moreover the bad colds

don't allow its introduction. The total rest of the Yugoslav territory except the higher mountainous parts of it may be estimated as being, on the average, ecologically similar to the northern parts of the natural range of the coastal Douglas-Fir. As far as the precipitation quantity is concerned, its totals are higher the nearer the coastal ridges, but the parent rock there is calciferous and the summer depression of the rain amount is stressed. The farther inland the smaller are the precipitation quantities becoming finally as low as they are in the southernmost part of the natural area of the coastal Douglas-Fir. Fortunately, they are not hit by a definite summer drought and encompass areas of sandstones and silicious parent rocks. In those continental regions, the Douglas-Fir is ecologically a stranger because the diferent precipitation distribution may bother its rhythm of vegetation. In addition to this, the eastern regions of Yugoslavia are not only dry but have also rough temperature conditions considering that the yearly amplitude rises as high as to 26°C, and this is, without any doubt, a bad environmental feature for the coastal Douglas-Fir.

Potential growing areas for the Western White Pine in Yugoslavia. Sites more or less parallel to the natural ones may be expected first of all in the silicious Macedonia in altitudes between 1000 - 1500 m, presumed that soils of a sufficient depth can be found. In the Coastland, the Slovene Brkini Hills are siutable. In continental Yugoslavia, all sandstone and solicious areas are favorable, and the best altitudes would be up to 1200 m in Slovenia, and then gradually higher in the southern direction. The lower altitudinal limits would rise from 400 to 800 m, and even higher up in Macedonia.

Potential growing areas for the Ponderosa-Pine in Yugoslavia.

While accentuating the drought resistance of the Ponderosa-Pine one is induced to think immediately of the possibility to introduce it to Macedonia, but there are obstacles. In the valleys and plains, that is between 100 - 700 m a.s., Macedonia is too warm and to dry to allow a good thriving. It would therefore be necessary to go higher up to some 900 m and look after suitable sites there and higher. The full success may be assured only by selecting soils of a sufficient depth. Beyond this, we can expect good results all over Serbia and the rest of drier areas, such as Goriško in Slovenia. Without any doubt, we may rely upon the Ponderosa-Pine in regions which - given a proper soil basis - are climatically more favorable than is the natural area of this Pine.

Potential growing areas for the Eastern White Pine in Yugoslavia.

The climatic types of the inner regions of Yugoslavia correspond well to the requirements of the Eastern White Pine, as well in the terms of warmth as of precipitation distribution. We are justified to believe that the regular depression of rain quantity in July, August, or September all over the Yugoslav territory won't cause sensible tensions in the physiological condition of the Pine when introduced since such depressions occur also in a part of the natural original area. There is, however, some ecological incompatibility, what may be concluded from the heavy suffering because of the root-rot, while, in the native area, the White Pine weevil is the most serious menace.

It is, after all, very regrettable that the typing brought so many errata; but a surveyed or second typing was not possible, and a correction of all faults would have spoiled the form completely.

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## Terminal remarks

After what was said in the report, I wish to mention some more things.

The elaborated report in its delivered form is one-sided despite of its many - sidedness, and, because of the time scarcity, is even not completely concluded as such. To make it to a biologically and ecologically complete description of the fast growing American conifers some important new chapters should have been included, dealing with the soils within the natural areas of the conifers studied, with the growth characteristics of these conifers in different soil and climate conditions, and finally with their diseases, and pests. These chapters have not been prepared not only because of the lack of time, and means, but also because for their elaboration a certain amount of scientific literature were necessary. Unfortunately, I could not take profit of the partinent literature collected in the States dealing with these ecological aspects because it has not yet been handed out to me. Certainly, I would not have time to use this literature properly to complete my report, but I nevertheless regret all obstacles encountered because of my essential interest in the complex of problems mentioned.

I must not forget to mention the absence of climatological maps in the report. As a matter of fact, a number of them have been drawn for the whole territory of Yugoslavia each single one representing one single climatological factor. It was, however, not possible to reproduct these maps for the purpose of including them in the copies of the report.

It is, after all, very regrettable that the typing brought so many errata; but a surveyed or second typing was not possible, and a correction of all faults would have spoiled the form completely.

(38) TABEL



| Stopnje | S F R J | Z D A |
|---|---|---|
| -25,1 --27,5° | Stara Fužina, Martinček, Dom na Krvavcu, Ljubljana - letališče, Češenik, Šmartno pri Slov. Gradcu, Vrhnika, Novo mesto-Kandija, Črnomelj, Stara vas, Koprivnica, Karlovac, Stubičke Toplice, Čazma, Garešnica, Lipik, Virovitica, Slav. Požega, Brestovac-Belje, Osijek-sinop.Bos.Dubica, Banja Luka, Kupres, Doboj, Maoča, Bjelašnica, Gacko, Palić, Novi Kneževac, Bački Petrovac, Vrbas, Srbobran, Stari Bečej, Senta, Čoka,Kikinda, Srem.Mitrovica, Valjevo, Kragujevac, Smederevo, Kovin, Bela Crkva, Vel.Gradište, Kraljevo, Kopaonik, Svetozarevo, Pirot, Dimitrovgrad, Uroševac, Bujanovac, Tetovo, Kočani, | Misoulla, Astoria, Walla Walla, Meacham,— Dayton, Montgomery, Nashville, Lexington, Cincinnati, Springfield, Columbus, Trenton, Peoria, Central Park N.Y., Fort Wayne, Williamsport, Chicago, Detroit, Milwaukee, Rochester N.Y., Muskegon, Marquette, |
| -27,6 --3o,o° | Rovtarica, Podbrezje, Voglje, Planina-Rakek, Sodražica, Mokronog, Kredarica, Varaždin, Križevci, Ogulin, Batinac, Božjakovina, Petrinja, Hrvat.Dubica, Vinkovci, Derventa, Bihać, Teslić-Vručica, Bijeljina-N.selo, Rogatica, Prijedor, Novi Sad, Zrenjamin, Šabac, Pančevo, Smed.Palanka, Sušara, Kokin Brod, Užič.Požega, Čačak, Novi Pazar, Rekovac, Kruševac, Čuprija, Zaječar, Crvenka-Panč.rit, Jaša Tomić, Plevlja, Bijelo Polje, Kolašin, Bitola, | Cheyenne, Mount Rainer-Paradise Ranger,— Sioux City, Indianapolis, Des Moines, Rockford, Blue Hill WB, Buffalo, |
| -3o,1 - -32,5° | Postojna-Zalog, Slovenska vas, Kočevje, Topusko, Drvar, Sanski most, Bugojno, Prnjavor, Butimir, Vršac, Gor.Milanovac, Žagubica, Mihovac-Tara, Berovo, | Spokane, Yakima, Lewiston, Pendleton, Burns—Dubruque, Evansville, Moline, South Bend, Hartford, Pittsfield, Albany, Grand Rapids, Flint, Syracuse, Sault Ste.Marie, |
| -32,6- -35,o° | Babno polje, Rakitna, Rudno polje, Zalesina, Gospić-sinop,, Sokolac Sjenica, | Kalispell, Chemult, — Parkersburg, Burlington, Binghamton, Worcester, Waterloo, Burlington W., Alpena, |
| -35,1 - - 37,5° | | Great Falls, Sheridon, Idaho Falls, Pocatells, Lander, — Duluth, Green Bay, Minneapolis St.Paul, Escanaba, |
| - 37,6 - 40,o° | | Concord, Madison, Portland, La Crosse, |
| - 40,1 - -42,5° | | Helena, Casper, — Saint Clond, Rochester Min., Caribou, International Falls, |
| - 42,6,- - 45,o° | | Mount Washington, |
| - 45,1 - -47,5° | | Glasgow, — |
| - 47,6 - - 5o,o° | | Havre — |

SKRAJNI TOPLOTNI UPADKI

Absolute temperature minima

/ I - 2 /

| Stopnje | S F R J | Z D A |
|---|---|---|
| 0,0 - 2,5° | | |
| -2,6 - - 5,0° | Veli Lošinj, Palagruša, Herceegnovi, | |
| -5,1 - - 7,5° | Mali Lošinj, Kaštel Stari, Hvar, Opuzen, Vela Luka, Lastova, Korčula, Dubrovnik, Čibača, | Eureka, Oakland, Bakersfield, Burbank, — |
| -7,6 - - 1o,0° | Rab-sinop. Zadar, Biograd, Split-Marjan, Orebić, Ston, Gruda, Titograd, Ulcinj, | Fresno, Crater, Lake, — |
| -1o,1 - -12,5° | Vipolže, Poreč, Rovinj, Opatija, Fažma, Pula, Pag, Šibenik, Imotski, Domanovići, Mostar, Gjevgjelija, Novi Dojvan, | Tatvosh Island, Seattle, — Atlante, Florence, Wilmington, Cape Hatteras, Norfolk, |
| -12,6 - -15,0° | Šempeter, Koper, Škocjan-Koper, Kubad, Loče, -,Vipava, Rijeka, Kraljevica, Crikvenica, Mosor-Ljubač, Čapljina, Bijelo polje, Valandovo, | Rosenburg, Sexton Summit, — Greenville, Charlotte, Raleigh, |
| -15,1 — 17,5° | Bovec, Trenta, Solkan, Temenica, Sežana, Ajdovščina-let., Senj, Lištica, Ohrid, | Portland, Blue Kanyon, — Winston-Salem, Birmingham, Chattanooga, Roanoke, Lynchburg, Washington D.C.Philadelphia, |
| -17,6 - -2o,0° | Tolmin, Golnik, Šmarna Gora, Zagreb-Grič, Knin, Bradina, Lastva, Gladnoš /Maradik/, Topola, Bor, Nikšić, Erdželija, Kavadarci, Radoviš, | Olimpia, Medford, Mount Shasta, — Asheville, Rome, Knoxville, Oak Ridge WB, Oak Ridge Area, Huntington, Reading, Blook Island, Nantucket, |
| -2o,1 - -22,5° | Kranjska Gora, Cerkno, Planina-Golica, Bled, Luče, Radlje, Planina-Sevnica, Jeruzalem, Vel. Dolenci, Krško, Kostel, Pazin, Skrad, Lipovljani, Ilok, Jajce, Zenica, Livno, Prozor, Sarajevo, Goražde, Srem.Kamenica, Srem.Karlovci, Beograd, Bukov.banja, Jarmenovci, Boč, Aleksandrovac, Đakovica, Niš, Peć, Dragaš, Vranje, Predejane, Kriva Palanka, Kruševo, Skopje, Prilep, Ržaničani, Demir Kapija, Strumica, | Eugene Boise, Bishop, — Columbia, Greensboro, Bristol, Cairo, Luisville, Charleston, Baltimore, Baltimore Custom H., Atlantic City Wilmington Del., Harrisburg, Newark, La Guardia Field, Bridgeport, New Haven, Cleveland, Erie, |
| -22,6 - -25,0° | Rateče-Planica, Dom na Komni, Jezersko, Ljubljana-Bežigrad, Gornji grad, Grbin, Velenje, Podlehnik, Zavrč, Višnja gora, Sv.Miklavž, Brežice, Ribniška koča, Parg, Delnice, Bistruc, Lučko, Slijeme, Strubička gora, Sisak, Bjelovar, Daruvar, Slav.Brod, Đakovo, Osijek-Neuman, Plitv. Leskovac, Sinj, Zagreb-Bot.vrt, Drinič, Tuzla, Kalinovik, Bileća, Sombor, Šid, Koviljača, Loznica, Zemun-aerodrom, Negotin, Zlatibor, Titovo Užice, Vrnjač.banja, Kuršumlja, Prokuplje, Aleksinac, Sokobanja, Butelj, Kumanovo, Lazaropolje, Resen, Trubarevo, Štip, | Stampede Pass, Salen, Mount Rainier - Longmire Ranger, — Pittsburgh, Akron, Memphis, Richmond, Frederick, Allentown, Monsfield, Youngstown, Scranton, Sandusky, Toledo, Providence, Detroit Willow Runm Boston, Lansing, |

| Stopnje | S F R J | Z D A |
|---|---|---|
| 37,6 - 40,0° | Stari Bečej, Senta, Biserno ostrvo, Čoka, Zrenjamin, Kikinda, Vršac, Valjevo, Beograd, Gor.Milanovac, Smederevo, Smed.Palanka, Žagubica, Titovo Užice, Čačak, Vrnjačka banja, Aleksandrovac, Rakovac, Prokuplje, Sokobanja, Pirot, Dimitrovgrad, Prizren, Pristina, Uroševac, Prečevo, Oranje, Vlasatinci, Predejane, Surdulica, Plevlja, Bijelo polje, Ulcinj, Tetovo, Bitola, Prilep, Kočani, | Albany, Grand Rapids, Rochester N.Y., Madison, Portland, La Crosse, Burlington W., Escanaba, Maryuette, |
| 40,1 - 42,5° | Šempeter, Solkan, Sv.Križ Začr.Karlovac, Lučko, Batinci, Zagreb-Grič, Zagreb-Maksimir, Daturvar, Slav.Brod, Đakovo, Osijek Neuman, Osijek sinop., Knin, Bihać, Sanski most, Banja luka, Domanovići, Novi Knježevac, Šid, Bački Petrovac, Vrbas, Sremska Kamenica, Srem.Karlovci, Koviljača, Srem.Mitrovica, Šabac, Zemun-aerodrom, Buk.banja, Pančevo, Topola, Kragujevac, Bela crkva, Vel. Gradište, Negotin, Svetozarevo, Kruševac, Ćuprija, Niš, Zaječar, Leskovac, Titograd, Skopje, Štip, Strumica, | Havre, Calispell, Glasgov, Great Falls, Missoula, Yakima, Portland, Meacham, Salem, Sheridan, Eugene, Rosenburg, Casper, Oakland, Hount Rainier-Longmire Ranger, — Sioux City, Brirmingham, Columbia, Florence, Wilmington, Rome, Chattanooga, Memphis, Raleigh, Oak Ridge WB, Nashville, Cairo, Roanoke, Richmond, Evansville, Huntington, Parkersburg, Baltimore Custon H., Indianapolis, Columbus, Trenton, Newark, Central Park N.Y., Sandusky, Moline, Des Moines, Chicago, Detroit, Rochester Min., Minneapolis, St.Paul, Alpena, |
| 42,6 - 45,0° | Mostar, Srbobran, Demir Kapija, | Lewiston, Walla Walla, Pendleton, Chattanooga, Bishop, Fresno, Burbank, — Cincinnati, Springfield, Burlington, |
| 45,1 - 47,5° | | Medford, Bakersfield, — |

SKRAJNI TOPLOTNI VRHUNCI
Absolute temperature maxima
/I - 3/

| Stopnje | S F R J | Z D A |
|---|---|---|
| 1o,1 - 12,5° | | |
| 12,6 - 15,o° | | |
| 15,1 - 17,5° | | |
| 17,6 - 2o,o | Kredarica, | |
| 2o,1 - 22,5° | | Mount Washington |
| 22,6 - 25,o° | | |
| 25,1 - 27,5° | Dom Krvaveo, Ribniška koča, Kopaonik, | |
| 27,6 - 3o,o° | Dom na Komni, Rovtarica, Martinček, Rudno polje, Platak, | Eureka, — |
| 3o,1 - 32,5° | Sv.Miklavž, Sljeme, Vlasina, Lazaropolje, | Tatvosh Island, Stampedr Pass, — Mansfield, Block Island, Buffalo, |
| 32,6 - 35,o° | Rateče-Planica, Trenta, Kranjska gora, Planina Golica, Jezersko, Gomanca, Babno polje, Rakitna, Kočevje, Delnice, Palagruža, Kupres, Kalinovik, Gacko, Zlatibor, Sjenica, Ohrid, | Blue Kamyon, Mount Rainier - Paradise Ranger, Cratew Lake, — Alanta, Cape Hatteras, Luisville, Cleveland, Erie, Worcester, Lansing, |
| 35,1 - 37,5° | Boveo, Stara Fužina, Cerkno, Bled, Golnik, Voglje, Šmarna gora, Lače Šmartno Slov.gor., Dol Hrastnik, Radlje, Planina Senica, Tomnica, Koper, Postojna Zalog, Planina-Rakek, Vrhnika, Slovenska vas, Mokronog, Brežice, Poreč, Rovinj, Rijeka, Crikvenica, Skrad, Pula, Mali Lošinj, Zadar, Gospić-sinop, Lastovo, Dubrovnik, Gruda, Bogojno, Livno, Peć, Bosilj grad, Herceegnovi, Cetinje, Nikšić, Kolašin, Kriva Palanka, Berovo, | Cheyenne, — Greenville, Asheville, Pittsburgh, Dubuque, Duluth, Montgomery, Charlotte, Nantucket, Scranton, Toledo, Providence, Hartford, Pittsfield, Milwaukee, Flint, Syracuse, Muskegon, Green Bay, Sault Ste.Marie, Caribou, International Falls, |
| 37,6 - 4o,o° | Tolmin, Podbrezje, Ljubljana-Bež.Ljubljana-let. Kamnik, Češenik, Gornji grad, Grbin Litija, Velenje, Hotemež-Radeče, Celje-Medlog- od S4: Levec, Svečina, Rog.Slatina , Maribor-Tezno, Pragersko, Ptuj, Podlehnik, Zavrč, Mur.Sobota-Rak. Vel.Dolenci, Vipolže, Škocjan Koper, Kubed, Sežana, Ajdovščina-let, Loče Vipava, Višnja gora, Sodražica, Novo mesto-Kandija, Črnomelj, Radovica, Krško, Stara vas, Kostel, Klenovnik, Varaždin, Križevci, Koprivnica, Pazin, Opatija, Ogulin, Božjakovina, Sisak, Bjelovar, Lipik, Virovitica, Šibenik, Kaštel Stari, Split Marjan, Sinj, Vela Luka, Orebić, Jajce, Zenica, Maoča, Tuzla, Sarajevo, Butmir, Palać, Sombor, Novi Sad, | Spokane, Seattle, Olympia, Helena, Astoria, Burns, Idaho Falls 46 W, Pocatello, Lander, Sexton-Summit, Mount Shasta, Chemult, — Winston - Salem, Dayton, Akron, Saint Clond, Knoxville, Oak Ridge Area, Greensboro, Bristol, Norfolk, Lynchburg, Lexington, Charleston, Washington D.C., Baltimore, Frederick, Atlantic City, Wilmington Del., Philadelphia, Harrisburg, Reading, Allentown, Peoria, La Guardia - Fild, Field, Fort Wayne, Bridgeport, Williamsport, New Hewen, Youngstown, South Bend, Binghamton, Concord, Rockford, Blue - Hill WB, Detroit Willow Run, Boston, Waterloo, |

ŠTEVILO DNI Z MIN $< -10^{0}$
/I - 4/

| Stopnje | S F R J |
|---|---|
| 0 | Vipolže, Šempeter, Solkan, Koper, Škocian Koper, Poreč, Rovinj, Opatija, Rijeka, Kraljevica, Crikvenica, Fažana, Pula, Cres, Mali Lošinj, Veli Lošinj, Lun Gager, Rab sinop., Zadar, Biograd na moru, Šibenik, Kaštel Stari, Split Marjan, Split Spinut, Hvar, Opuzen, Palagruža, Vela Luka, Lastovo, Korčula, Orebić, Ston,Dubrovnik, Čibača, Gruda, Čapljina, Domanovići, Mostar, Hercegnovi, Budva, Vir Pazar, Bar, Titograd, Podgum, Ulcinj, |
| 1 - 5 | Tolmin, Trenta, Temlnca, Kubad, Sežana, Ajdovščina, Loče Vipava, Pazin, Zagreb-Grič, Senj, Pag, Knin, Mosor Ljuvača Sinj, Imotski, Ličtica, Bileća, Lastva, Nikšić, Struga, Ohrid, Trubarevo, Rržaničani, Titov Veles, Erdželija, Kavadarci, Štip, Demir Kapija, Gevgelija, Valandovo, Novi Dojran, Strumica, Radoviš, |
| 6 - 10 | Bovec, Golnik, Planina Sevnica, Jeruzalem, Karlovac, Lipoljani, Osijek, Neuman, Ilok, Zagreb Bot.vrt, Sremska Kamenica, Srem.Karlovci, Gladnoš /Maradik/, Zemun-aer., Beograd, Jarmenovci, Topola, Vel.Gradište, Bor, Svetozarevo, Čuprija, Aleksinac, Niš, Peć, Prizren, Vranje, Vlasotinci, Predejane, Cotinje, Crvenka-Panč.rit, Tetovo, Butelj, Kumanovo, Kriva Palanka, Debar, Resen, Bitola, Skopje, Prilep, Kočani, |
| 11 - 15 | Ljubljа-Bež., Hotemež, Rog.Slatina, Vel.Dolenci, Postojna Zalog, Planina-Rakek, Novo mesto-Kandija, Črnomelj, Sv.Miklavž, Brežice, Stara vas, Kostel, Varaždin, Križevci, Koprivnica,Parg,Skrad, Bistrac, Lučko, Stubičke Toplice, Božjakovina, Petrinja, Sisak, Čazma, Bjelovar, Garešnica, Lipik, Daruvar, Slav.Požega, Slav.Brod, Đakovo, Brestovac-Belje, Osijek sinop., Vinkovci, Zagreb-Maksimir, Derventa, Bihać, Sanski most, Banja Luka, Jajce, Teslić, Zenica, Doboj, Tuzla, Brčko, Bijeljina-N.Selo, Livno, Sarajevo, Goražde, Palić, Novi kneževac, Sombor, Sid, Bački Petrovac, Vrbas, Srbobran, Novi Sad, Stari Bečej, Čoka, Zrenjamin, Kikinda, Vršac, Koviljača, Loznica, Srem.Mitrovica, Šabac, Valjevo, Bukvič.banja, Pančevo, Kragujevac, Smederevo, Smed.Palanka, Kovin, Sušara, Bela Crkva, Žagubica, Negotin, Tit.Užice, Užička Požega, Čačak, Novi Pazor, Kraljevo, Vrnjačka banja, Aleksandrovac, Rekovac, Kuršumlija, Kruševac, Prokuplje, Sokovanja, Zaječar, Pirot, Dimitrovgrad, Drugaš, Kosovska Mitrovica, Priština, Uroševac, Proševo, Bujanovac, Leskovac, Surdulica, Jaša Tomić, Ivanjica, Kruševo, Delčevo, |
| 16 - 20 | Stara Fužina, Planina Golica, Bled, Ljubljana-let., Velenje, Svečina, Maribor-Tezno, Pragersko, Ptuj, Mur.Sobota-Rak., Gomance, Višnja gora, Mokronog, Delnice, Ogulin, Sljeme, Botinec, Topusko, Bos,Dubica, Drvar, Bugojno, Prnjavor, Maoča, Prozor, Gacko, Debeli lug, Goč, Bosiljgrad, Bijelo polje, Ivangrad, Berovo, |
| 21 - 25 | Luče, Kočevje, Gospić sinop., Plitvički Leskovac, Drinić, Butmir, Gor.Milanovac, Mitrovac na Tari, Zlatibor, Plevlja, Kolašin, Kukavice, Lazaropole, Mavrovo- Hanovi, |
| 26 - 30 | Jezersko, Rakitna, Sodražica, Ribniška koča, Zalesina, Kupres, Kalinovik, Rogatica, |
| 31 - 35 | Rateče - Planica, Dom na Komni, Šmartno Slov.gor., Vlasina, |
| 36 - 40 | Babno polje, Sokolac, Sjenica, |
| 41 - 45 | Rovtarica, Bjelašnica, Kopaonik, |

| Stopnje | S F R J | ZDA |
|---|---|---|
| 101 - 105 | | |
| 106 - 110 | | Duluth, |
| 111 - 115 | | International Falls, |
| 125,1 | Bjelašnica, | |
| 167 | | Mount Washington, |

| Stopnja | S F R J | Z D A |
|---|---|---|
| 21 – 25 | Sombor, Bački Petrovac, Vrbas, Novi Sad, Sremska Kamenica, Čoka, Zrenjanin, Kikinda, Koviljača, Gor.Milanovac, Jarmenovci, Šušara, Negotin, Titovo Užice,Soko banja, Zaječar, Dimitrovgrad, Dragaš, Kos.Mitrovica, Priština, Uroševac, Kolešin, Jaša Tomić, | |
| 26 – 3o | Gomanca, Babno polje, Sodražica, Kostel, Stubička gora, Gospić sinop., Bugojno, Butmir,Sarajevo, Rogatica, Žagubica, Debeli lug, Užička Požega, Lazaropole, Mavrovo-Hanovi, | Columbus, Williamsport, |
| 31 – 35 | Rateče-Planica, Planina Golica, Jezersko, Sv. Miklavž, Delnice, Zalesina, Skrad, Plitvički Leskova, Dimić, Bor, Plevlja, | Dayton, Indianapolis, Bringfield, |
| 36 – 4o | Rovtarica, Platak, Parg, Kalinovik, Kruševo, | Spkane, Pocatello – Burlington, Cleveland, Sandusky, Hartford, |
| 41 – 45 | Sjenica, Kukavica, | Meachgam, Sheridan, — Akron, Peoria, Fort Wayne, Youngstown, Soranton, Moline, Toledo, South Bend, Chicago, Erie, Binghamton, Concord, Bluettill WB, Detroit Portland, |
| 46 – 5o | Dom na Komni, Sljeme, Sokolac, Mitrovac na Tari, Zlatibor, Goč, Vlasima, | Great Falls, Missoula, Casper, Lander, Cheyenne, — Detroit, Albany, Syracuse, |
| 51 – 55 | Srbobran, | Helena, Idaho Falls 46 W, — Pitts burgh, Sioux City, Des Moines, Rockford, Worcester Grand Rapidg, Rochester N.Y., Muskegon, |
| 56 – 6o | Kupres, | Kalispell – Waterloo, Buffalo, Milvaukee, |
| 61 – 65 | | Havre, Crater Lake, — Lansing, Flint, Madison, Burlington Ver., |
| 66 – 7o | | Dubuque, Pittsfield, La Crosse, |
| 71 – 75 | | Maunt Rainier – Paradise Ranger, — Mansfield, Alpena, |
| 76 – 8o | | Glasgow, — Green Bay, |
| 81 – 85 | | Rochester Min., Minneapolis St. Paul, Escanaba, |
| 86 – 9o | Kopaonik, | Marquette, |
| 91 – 95 | | Saint Clond, Sault Ste.Marie, |
| 96 – 1oo | | Stampede Pass, — Caribou, |

ŠTEVILO DNI Z MAX < 0°C

Mean number of days with a temperatur maximum of 0°C

/I - 5/

| Stopnja | S F R J | Z D A |
|---|---|---|
| 0 | Poreč, Rovinj, Veli Lošinj, Lun Gager, Rab sinop., Zadar, Biograd na moru, Kaštel Stari, Hvar, Opuzen, Palangruža, Vela Luka, Lastovo, Korčula, Orebić, Ston, Dubrovnik, Čibača, Čapljina, Herceegovi, Budva, Vir Pazar, Bar, Podhum, | Eureka, Oakland, Fresno, Bakersfield, Burbank, — Montgomery, |
| 1 - 5 | Tolmin, Vipolže, Solkan, Šempeter, Koper, Škocjan, Koper, Kubed, Ajdovščina, Loče Vipava, Pazin, Opatija, Rijeka, Kraljevica, Crikvenica, Pažana, Pula, Cres, Mali Lošinj, Senj, Pag, Knin, Šibenik, Split-Marjan, Sinj, Imotski, Mavča, Ličtica, Domanovići, Mostar, Bileća, Lastva, Cetinje, Titograd, Ulcinj, Ohrid, Titov Veles, Demir Kapija, Đjerđelija, Valandovo, Novi Dorjah, Strumica, | Tatovsh Island, Seattle, Olympia, Astoria, Portland, Eugene, Rosenburg, Medford, Bishop — Breenville, Winston-Salem, Atlanta, Birmingham, Wilmington, Rome, Chattanooga, Memphis, Charlotte, Cape, Hatteras, Knoxville, Raleigh, Oak Ridge WB, Oak Ridge Area, Greeusboro, Norfolk, |
| 6 - 1o | Bovec, Trenta, Planina Sevnica, Temnica, Sežana, Mosor-Ljuvač, Nikčić, Butelj, Deber, Struga, Resen, Skopje, Trubarevo, Ržaničani, Erdželija, Kavadarci, Štip, Kočani, Radviš, | Mount Shasta — Asheville, Nashville, Bristol, Cairo, Roanoke, Lynchburg, Richmond, Washington D.C. |
| 11 - 15 | Hotemež, Črnomelj, Sisak, Bujanovac, Leskovac, Bosiljgrad, Tetovo, Kumanovo, Kriva Palanka, Bitola, Prilep, Berovo, Delčevo, | Chemult, Mount Rainier Longmire Ranger, — Charleston, Huntington, Baltimore, Baltimore Custom H., Atlantic City, Wilmington, Philadelphia, Block Island, |
| 16 - 2o | Bled, Luče, Radlje, Rog.Slatina, Pragersko, Ptuj, Jeruzalem, Planina Rakek, Višnja Gora, Mokronog, Novo mesto-Kandija, Brežice, Stara vas, Karlovac, Botinec, Zagreb-Grič, Topusko, Petrinja, Bjelovar, Slov.Požega, Đakovo, Osijek Neuman, Osijek sinop., Vinkovci, Ilok, Zagreb Bot.vrt, Zagreb-Maksimir, Drvar, Banja Luka, Zenica, Doboj, Tuzla, Brčko, Bijeljina-N.Selo, Livno, Prozor, Goražda, Novi Kneževac, Sid, Srem.Karlovci, Stari Bečej, Senta, Gladnoš /Maradik/, Vršac, Loznica, Srem.Mitrovica, Šabac, Valjevo, Zemun-aerodrom, Beograd, Bukovičbanja, Pančevo, Topola, Kragujevac, Smederevo, Kuršumlijja, Kruševac, Čuprija, Prokuplje, Aleksinac, Niš, Pirot, Peć, Prizren, Prečevo, Vranje, Vlasotinci, Predejane, Surdulica, Bijelo polje, Crvenka - Panč.vit, Ivanjica, | Lewiston, Salem, Burns, Boise, Blue Canyon, — Lexington, Evansville, Frederick, Trenton, Harrisburg, Reading, Nelvark, La Guardia Field, Central Park N.Y., Bridgeport, Nantucket, |
| 21 - 25 | Golnik, Ljubljana-Bež., Ljubljana-Iet., Šmartno Slov.Gor. Velenje, Svečina, Maribor-Tezno, Mur. Sobota-Rak., Vel.Dolenci, Postojna Zalog, Kočevje, Varaždin, Križevci, Koprivnica, Ogulin, Bistrac, Stubičke Toplice, Božjakovina, Čazma, Lipovljani, Garešnica, Lipik, Daruvar, Slav.Brod, Brestovac-Belje, Bos.Dubica, Derventa, Bihać, Sanski most, Jajce, Prujavor, Teslić, Gacko, Prijedor, Palić, | Yakima, Walla Walla, Pendleton, Sexton Summit, — Luis ville, Cincinati, Parkersburg, Allentown, New Havern, Providence, Boston, |

| Stopnja | S F R J | Z D A |
|---|---|---|
| 31 - 35 | Cres, Šibenik, Ston, Bijeljina-N.selo, Bileća, Novi Kneževac, Šid, Srbobran, Novi Sad, Šabac, Kragujevac, Smederevo, Kovin, Bela Crkva, Rekovac, Kruševac, Čuprija, | Yakima, Pendleton, Pocatello, — Charlotte, Burlington I., |
| 36 - 4o | Split Marjan, Opuzen, Brčko, Goražde, Valjevo, Pančevo, Svetozarevo, Prokuplje, | Missoula, Lewiston, Walla - Winston-Salem, Oak Ridge WB, Oak Ridge Area, Grensboro, Norfolk, |
| 41 - 45 | Knin, Kaštel Stari, Lastva, Negotin, Aleksinac, | Sioux City, Konoxville, Roanoke, Richmond, Evansville, Huntington, |
| 46 - 5o | Imotski, | Medford, Burbank, — Greenville, Vilmington, Raleigh, |
| 51 - 55 | Lištica, | Cairo, |
| 56 - 6o | Domanovići, Mostar, | Boise, — Chattanooga, Nashville, |
| 61 - 65 | Čapljina, Titograd, Kriva Palanka, | |
| 66 - 7o | Niš, Herceg-novi, Budva, Nikšić, Bar, Ulcinj, Ohrid, Bitola, Prilep, Kavadarci, Štip, Demir Kapija, Kočani, Valandovo, | Montgomery, Birmingham, Rome, |
| 71 - 75 | Dimitrovgrad, Peć, Prizren, Priština, Uroševac, Vranje, Plevlja, Crkvice, Cetinje, Vir Pazar, Tetovo, Kumanovo, Struga, Resen, Skopje, Rčanič̆ani, Gevgelija, Novi Dojran, | Florence, Memphis, |
| 76 - 8o | Zaječar, Pirot, Dragaš, Bujanovac, Leskovac, Predejane, Surdulica, Vlasima, Bosiljgrad, Crvenka-Panč.rit, Kukavica, Jaša Tomić, Bijelo Polje, Kolašin, Butelj, Debar, Lazaropole, Kruševo, Trubarevo, Berovo, | |
| 81 - 85 | | |
| 86 - 9o | | Columbia, |
| 91 - 95 | | |
| 96 - 1oo | | |
| 1o1 - 1o5 | | Bishop, Fresno, — |
| 1o6 - 11o | | Bakersfield, — |

ŠTEVILO DNI S TOPLOTNIM VRHUNCEM > 30°C

Mean number of days with the temperature maximum of>30°C

/I - 10/

| Stopnja | S F R J | Z D A |
|---|---|---|
| 0 | Dom na Komni, Planina Golica, Rovtarica, Jezersko, Gomanci, Sv.Miklavž, Ribniška koča, Rudno polje, Krederica, Platak, Sljeme, Bjelašnica, | Tatosh Island, Eureka, — Buffals, Mount Washington, |
| 1 - 5 | Boveo, Rateče - Planica, Trenta, Kranjska gora, Stara Fužina, Bled, Golnik, Šmartno Slov.gor., Velenje, Planina Sevnica, Mur.Sobota-Rakičan, Temnica, Postojna-Zalog, Babno polje, Rakitna, Sodražica, Parg, Delnice, Zalesina, Skrad, Stubička gora, Mosor-Ljuvač, Kupres, Kalinovik, Mitrovac na Tari, Zlatibor, Sjenica, Kopaonik, Goč, | Seattle Olympia, Astoria, Meacham, Sexton Sammit Blue Kanyon, Oakland, — Pittsburgh, Duluth, Cape Hatteras, Mansfield, New Haven, Cleveland, Erie Blue Hill WB, Worcester, Pitts field, Lansing, Flint, Portland, Alpena, Sault Ste.Marie, Caribou, International Falls, |
| 6 - 10 | Voglje, Ljubljana - Bež.Ljubljana - letal., Luče, Radlje, Celje-Medlog, Svečina, Planina-Rakek, Višnjagora, Kočevje Kostel, Poreč, Rovinj, Ogulin, Gospić sinop., Plitvički Leskovac, Palagruža, Dimić, Livno, Prozor, Gacko, Sokolac, | Portland, Mount Rainer - Paradise Ranger— Akron, Dubuque, Atlanta, Bridgeport, Youngstown, Scranton, Providence, Binghamton, Syracuse, Muskegon, Burlington,Ver., Green Bay, Marquette, [illegible], La Crosse, [illegible], |
| 11 - 15 | Tolmin, Hotemež, Koper, Kubed, Ajdovščina, [illegible] Mokronog, Novo mesto- Kandija, Brežice, Stara vas, Varaždin, Križevci, Bistrac, Zagreb-Grič, Božjakovina, Pula, Rab sinop., Zadarm | Helena, Eugene, Chemult — Asheville, Saint Cloud, Atlantic City, Toledo, Hartford, Concord, Boston, Detroit, Albany, Grand Rapids, Milwaukee, Rochester N.Y., la Crosse, Rochester Min., |
| 16 - 20 | Vipolže, Koprivnica, Pazin, Opatija, Rijeka, Crikvenica, Stubičke Toplice, Petrinja, Sisak, Čazma, Bjelovar, Garašnica, Lipik, Daruvar, Mali Lošinj, Lun Gager, Lastovo, Dubrovnik, Zagreb-Bot.vrt, Zagreb-Maksimir, Bos.Dubica, Drvar, Bugojno, Sarajevo, Rogatica, Palić, Jermenovci, Debeli lug, | Spokane, Great Falls, Salem, Rosenburg, Mount Shasta — Dayton, Allentown, La Guardia Field, Central Park N.Y., Fort Wayne, Williamsport, Sandusky, South Bend, Detroit, Madison, Minneapolis St.Paul, |
| 21 - 25 | Črnomelj, Kraljevica, Karlovac, Botinec, Topusko, Lipovljani, Slav.Požega, Brestovac-Belje, Osijek sinop., Pag, Hvar, Korčula, Derventa, Bihać, Banja Luka, Jajce, Teslić, Tuzla, Butmir, Sombor, Vrbas, Gladuš /Maradik/, Gor.Milanovac, Žagubica, Bor, | Havre, Burns, Casper, Lander, Cheyenne - Bristol, Charleston, Parkersburg, Baltimore Custom H., Wilmington, Indianapolis, Philadelphia, Trenton, Harrisburg, Reading, Rook ford, Waterloo, |
| 26 - 30 | Solkan, Loče-Vipava, Slav.Brod, Đakovo, Osijek, Neuman, Vinkovci, Veli Lošinj, Senj, Bograd na moru, Vela Luka, Orebić, Čibača, Orešje, Sanski most, Prnjavor, Zenica, Doboj, Maoča, Prijedor, Bački Petrovac, Srem.kamenica, Srem.Karlovci, Stari Bečej, Senta, Čoka, Zrenjamin, Kikinda, Vršac, Koviljača, Loznica, Srem.Mitrovica, Zemun-aerodrom, Beograd, Bukovič-banja, Topola,Smed. Palanka, Sušara, Vel.Gradište, Tivovo Užice, Užič.Požega, Čačak, Novi Pazar, Kraljevo, Vrnjačka banja, Aleksandrovac, Kuršumljija, Sokobanja, | Calispell, Glasgow, Sheridan, Idaho Falls 46 W, Mount Rainier - Longmire Ranger — Lynchburg, Lixington, Luisville, Washington D.C. Cincinnati, Baltimore, Frederick, Springlield, Columbus, Peoria, Newark, Moline, Des Moines, Chicago, |

| Stopnja | S F R J | Z D A |
|---|---|---|
| 25,1 - 30° | Bukovo /Negotin/ | Kalispell, Great Falls, Misoula, Helena, Yakina, Sheridan, Boise, Idaho Falls 46 W, Casper, Pocatello, Lander, - Dayton, Evansville, Indianapolis, Springfield, Peoria, Fort Wayne, Sandusky, Toledo, South Bend, Chicago, Concord, Rockford, Detroit, Pittsfield, Albany, Lansing, Grand Rapids, Milwaukee, Syracuse, Rochester, N.York, Burlington, Alpena, Escanaba, Sault Ste.Marie, Marquette, |
| 30,1- 35° | | Havre, — Dubuque, Sioux City, Saint Cloud, Duluth, Burlington, Des Moines, Waterloo, Rochester Min., Green Bay, Minneapolis St. Paul, Caribou, International Falls. |
| 35,1 - 40° | | Glasgow - |

TOPLOTNA CELINSKOST
The thermal continentality
/I - 11/

| Stopnja | S F R J | Z D A |
|---|---|---|
| o - 5° | | Blue Kanyon — Eureka |
| 5,1-1o° | | Tatoosh Island, — |
| 1o,1- 15° | Kredarica | Seattle, Eugene, — |
| 15,1 -2o° | Dubrovnik, Hvar, Bonaster, Žirje, Vela Luka, Šipan, Vis, Sušak, Šibenik, Divulje, Bjelašnica, Omišalj, Kraljevica, Krk, Crikvenica, Rab, Kolašin, Senj, Split, Imotski, Trebnje, Snežnik, Solčava, Kočevska reka, Nevesinje, Ravna gora, Sv.Mihovil, Struga, Golnik, Blagovica, Loka /Zidani most, Sinj, Ljubinje, Jajce, Ivan Planina, Moščenica, Ivangrad, Mrzla Vodica, | Stampedte Pass, Crater Lake, Chemult, Portland, Salem, Rosenburg, Sexton Summit, Medford, Mount Shasta, Mount Rainier - Paradise Ranger, Monnt Rainier - Longmire Ranger - Greenville, Asheville, Montgomery, Atlanta, Birmingham, Columbia, Florence, Wilmington N.C., Rome, Cape Hatteras, Raleigh, Norfolk. |
| 2o,1- 25° | Laško, Rakitna, Sodražica, Kočevje, Primskovo/Dol., Neum Klek, Mostar, Resanovci, Bos. Grahovo, Crvljivica, Kalinovik, Cetinje, Perister, Kranjska gora, Mojstrana, Bled, Kamnik, Šentjur/Celje, Lepoglava, Jablanica, Pazarić, Berkovići, Ilidža, Sarajevo, Plevlja, Nikšić, Planina/Rakek, Gospić, Ljubljana, Celje, Rogaška Slatina, Maribor, Sv.Trojica/, Slov.Gor., Vrhnika, Grm/Novo mesto, Krško, Danilov-grad. Lipik, Žepče, Koviljača, Travnik, Kladanj, Sokolac, Novo mesto, Brežice, Titograd, Klenovnik, Križevci, Koprivnica, Topusko, Zagreb - Grič, Čazma, Daruvar, Zvornik, Bukovička banja, Priština, Borike, Trebnje, Adlešiči, Prizren, Veržej, Čakovec, Zagreb - Bot.vrt, Slov.Požega, Prijedor, Banja Luka, Modriča, Valjevo, Smederevo, Titovo Užice, Novi Pazor, Kraljevo, Vrnjačka banja, Peć, Kos.Mitrovica, Butmir, Bitola, Prilep, Radovište, Rakičan, Dol.Lendava, Slav.Brod, Bos. Gradiška, Bolina, Donja, Prnjavor, Osijek, Bijeljina, Srem.Mitrovica, Beograd, Ljubičevo /Požarevac, Kragujevac, Kruševac, Pirot, Vranje, Kočane, Belje, Novi Sad, Vršac, Vel.Gradište, Prokuplje, Niš, Štip, Strumica, Stari Bečej, Leskovac, Tetovo, Skopje, Demir Kapija, Senta, Jaša Tomić, Zaječar, Titov Veles, Bosiljgrad, | Spokane, Lewiston, Walla Walla, Pendleton, Meacham, Burns, Cheyenne, Bishop, Fresno, Bakersfield, — Winston - Salem, Pittsburgh, Akron, Chattanooga. Memphis, Charlotte, Kroxville, Greensboro, Nashville, Bristol, Cairo, Roanoke, Lynchburg, Lexington, Luisville, Charleston, Huntington, Washington D.C., Cincinati, Parkersburg, Baltimore Custom H., Frederick, Alantic City, Wilmington Del. Philadelphia, Columbus, Trenton, Harrisburg, Reading, Allentown, Central Park New York, Block Island, Bridgeport, Nantucket, New Haven, Youngstown, Scranton, Cleveland, Providence, Hartford, Erie, Brighamton, Blue Hill WB, Worcester, Boston, Buffalo, Portland, La Crosse, Mount Washington, |

| Sopnje | S R R J | Z D A |
|---|---|---|
| 3,1 - 4,0 | Blagovica, Bled, Dovje - Mojstrana, Golnik, Gomance, Kamnik, Kočev.reka, Ljubljana, Planina/Rakek, Postojna Ravb.kom., Rakitna, Sežana, Snežnik, Sodražica, Solčava, Učka, Bjelašnica, Ravna gora, | |
| 4,1 - 5,0 | Jezersko, Kranjska gora, Most na Soči, Mrzla Vodica, | - Mount Washington, |
| 5,1 - 6,0 | Bovec, Matajur, | |

POLETNI VLAŽNOSTNI KOLIČNIK
The quotient of summer humidity
/II - 1/

| Stopnja | S F R J | Z D A |
|---|---|---|
| 0,01 - 0,1 | | Yakima, Bishop, Fresno, Bakersfield, - |
| 0,2 - 0,5 | Struga, | Spokane, Seattle, Lewiston, Walla Walla, Pendleton, Portland, Salem, Eugene, Burus, Boise, Rosenburg, Casper, Sexton Summit, Medford, Mount Shaste, Eureka, Blue Kanyon, - |
| 0,6 -1,0 | Šibenik, Split, Hvar, Vela Luka/Korč.,Dubrovnik, Prokuplje, Priština, Tetovo, Bitola, Skopje, Prilep, Titov Veles, Štip, Demir Kapija, Kočane, | Kalispell, Glasgow, Great Falls, Crater Lake, Missoula, Helena, Chemult, Meacham, Sheridan, Idaho Falls 46 W, Lander, - |
| 1,1 - 2,0 | Koper, Lendava, Rijeka, Kraljevica, Krk, Crikvenica, Rab, Senj, Sinj, Mostar, Ljubinje, Trebinje, Titograd, Danilovgrad, Prizren, Čakovec, Križevci, Zagreb - Grič, Čazma, Lipik, Daruvar, Slav.Požega, Slav.Brod, Bos.Gradiška, Banja Luka, Prijedor, Modriča, Prnjavor, Osijek, Belje, Srem.Mitrovica, Novi Sad, Stari Bečej, Senta, Jaša Tomić, Vršac, Koviljača, Valjevo, Beograd, Smederevo, Ljubičevo/Požar., Vel.Gradište, Zvornik, Bukovo, Zaječar, Bukovič. banja Kragujevac, Tit.Užice, Kraljevo, Vrnjač.banja, Kruševac, Niš, Leskovac, Pirot, Peć, Kos. Mitrovica, Vranje, Bosiljgrad, Bos. Grahovo, Jajce, Travnik, Jablanica, Ivan Planina, Nevesinje, Pazarić,Ilidža, Butmir, Sarajevo, Kalinošek, Sokolac, Plevlja, Nikšić, Kolašin, Ivangrad, Gospić, Perister, Radovište. | Havre, Tatoovsh Island, Stampede Pass. Cheyenne, Mount Rainier - Longmire Ranger, - Asheville, Dayton, Pittsburgh, Akron, Sioux City, Saint Clound, Duluth, Memphis, Nashville, Cairo, Evansville, Luisville, Washington D.C.,Cincinnati, Frederick, Indianopolis, Springfield, Columbus, Peoria, Fort Wayne, Block Island, Nantucket, Clevland, Sandusky, Des Moines, Toledo, South Bend, Providence, Chicago, Erie, Binghamton, Boston, Detroit, Waterloo, Albany, Lansing, Grand Rapids, Buffalo, Milwaukee, Syracuse, Rochester N.York, Muskegon, Portland, Burlington, Green Bay, Minneapolis St.Paul, Alpena, Escanaba Sault Ste.Marie, Marquette, Caribou, |
| 2,1 - 3,0 | Adlešičiy Ajdovščina, Bobno Polje, Brežice, Celje, Črnomelj, Gradišče v Slov.Gor., Grm/ Novo mesto, Kočevje, Krško, Kubed, Laško, Grbin/Litija, Loka/Zid.most, Maribor, Primskovo/Dol., Rakičan, Rog.Slatina, Šentjur/Celje, Trebnje, Veržej, Lepoglava, Klenovnik, Koprivnica, Topusko, Žepče, Bijelina, Crvljivica, Kladanj, Borika, Cetinje, | Mount Rainier-Paradise Ranger, - Greenville, Winston - Salem, Dubuque, Montgomery, Atlanta, Birmingham, Columbia, Florence, Wilmington N.C., Rome, Chattanooga, Charlotte, Cape Hatteras, Knoxville. Raleigh, Greensboro, Bristol, Norfolk, Roanoke, Lynchburg, Lexington, Charleston, Huntington, Parkersburg, Baltimore Custom H., Atlantic City, Wilmington Del., Philadelphia, Trenton, Harrisburg, Reading, Allentown, Central Park New York, Burlington, Bridgeport, New Haven, Youngstown, Scranton, Hartford, Concord, Rockford, Worcester, Pittsfield, La Crosse, Rochester Min., International Falls, |

| Stopnke | S F R J | Z D A |
|---|---|---|
| 241 - 25o | Rateče - Planica, Tolmin, Bled, Jezersko, Šmartno Slov.Gor.,Planina, Sevnica, Rog.Slatina, Maribor - Tezno, Mur.Sobota-Rakičan, Vel.Dolenci, Postojna Zalog, Varaždin, Koprivnica, Rovinj, Platak, Parg, Ogulin, Božjakovina, Garešnica, Daruvar, Đakovo, Gospić sinop., Bihać, Drvar, Jajce, Zenica, Tuzla, Ličtica, Prozor, Butmir, Lastra, Smem, Karlovci, Vršac, Ložnica, Valjevo, Zemun-aerodrom, Kragujevac, Smed.Palanka, Bela Crkva, Vel. Gradište, Negotin, Novi Pazar, Kraljevo, Kuršumlija, Sokobanja, Zaječar, Dimitrovgrad, Peć, Prizren, Priština, Bosiljgrad, Plevlja, Crkvice, Kolašin, Kumanovo, Struga, Lazaropole, Resen, Kruševo, Bitola, Skopje, Kočani, | Tatoosh Island, Spokane, Missoula, Portland, Salem, Medford, - Sault Ste.Marie, |
| 251 - 26o | Stara Fužina, Golnik, Ljubljana-Bežigrad, Velenje, Hotemež-Radeče, Celje-Medlog, Zavrč, Jeruzalem, Babno polje, Novo mesto-Kandija, Brežice, Kostel, Križevci, Zalesina, Skrad, Karlovac, Bistrac, Sljeme, Botinec, Topusko, Sisak, Čazma, Bjelovar, Lipik, Slav. Požega, Slav.Brod, Osijek Neuman, Brestovac-Belje, Osijek sinop., Vinkovci, Zagreb - Maksimir, Bos.Dubica, Drinić, Sanski most, Banja Luka, Bugojno, Doboj, Gacko, Sokolac, Goražde, Palič, Bački Petrovac, Novi Sad, Senta, Čoka, Šabac, Kovin, Mušara, Žagubica, Bor, Mihovac Tara, Zlatibor, Sjenica, Užič. Požega, Vrnjačka banja, Kruševac, Ćuprija, Prokuplje, Uroševac, Vranje, Leskovac, Vlasotinci, Predejane, Vlasina, Butelj, Debar, Trubarevo, Ržaničani, Berovo, | Mouut Washington, |
| 261 - 27o | Ljubljana-letališče, Višnja gora, Kočevje, Delnice, Petrinja, Derocuta, Kupres, Prnjavor, Bijeljina-N.selo, Bjelačnica, Rogatica, Sombor, Vrbas, Stari Bečej, Zrenjanin, Kikinda, Srem.Mitrovica, Čačak, Kopaonik, Aleksandrovac, Pirot, Mavrovo - Hanovi, | |
| 271 - 28o | Kalinovik, | |
| 281 - 3oo | | |
| 3o1 - 31o | | Helena, Sheridan - |

ZIMSKI VLAŽNOSTNI POKAZATELJ
The winter humidity index
/II - 2/

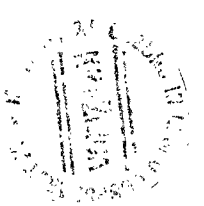
| Stopnje | S F R J | Z D A |
|---|---|---|
| 151 - 16o | | Boston |
| 161 - 17o | | Cheyenne, - |
| 171 - 18o | | Lander, - |
| 181 - 19o | Split Marjan | Great Falls, Casper, - Greenville, Winston - Salem, Roanoke, Washington D.C., La Guardia Field, Central Park New York, |
| 191 - 2oo | Senj, Šibenik, Dubrovnik,Bar, | Atlanta, Florence, Charlotte, Raleigh, Lynchburg, Baltimore Custom H., Philadelphia, Harrisburg, Newark, Providence, Worcester, |
| 2o1 - 21o | Planina Golica, Rijeka, Kraljevica, Crikvenica, Lun Gager, Rab sinop., Hvar, Imotski, Korčula, Mostar, Herceegnovi, | Bakersfield, - Asheville, Sioux City, Columbia, Rome, Chattanooga, Greensboro, Norfolk, Charleston, Baltimore, Atlantic City, Wilmington Del., Bridgeport, Williamsport, Hartford, Concord, Blue Hill WB. |
| 211 - 22o | Koper, Ajdovščina-let., Opatija, Cres, Pag, Knin, Kaštel Stari, Mosor - Ljuvač, Lastovo, Orebič, Domanovići, Budva, Titograd, Ulcinj, Kriva Palanka, | Boise - Pittsburgh, Montgomery, Birmingham, Wilmington N.C., Memphis, Knoxville, Nashville,Bristol, Cincinnati,Parkesburg, Allentown, Scranton, Cleveland, Albany, Madison, Portland,La Crosse, Rochester Min., Marquette Caribou, International Falls. |
| 221- 23o | Sežana, Pula, Mali Lošinj, Veli Lošinj, Zadar, Sinj, Palagruža, Vela Luka, Ston, Čibača, Bileća, Nikšič, | Glasgow, Yakima, Burns, Pocatello, Mount Shasta, Fresno, - Dayton, Dubuque, Saint Cloud, Duluth, Cape Hatteras, Lexington, Evansville, Luisville, Indianopolis,Springfield, Columbus, Peoria, Burlington, Nantucket, Moline, Des Moines, Chicago, Detroit Willov Run, Detroit, Lansing, Buffalo, Milwaukee, Syracuse, Burlington, Green Bay, Minneapolis St.Paul, Alpena, Escanaba, |
| 231 - 24o | Bovec, Loče Vipava, Pazin, Stubička gora, Zagreb - Grič, Lipovljani, Ilok, Fažana, Plitvički Leskovac, Livno, Čapljina, Sarajevo, Beograd, Niš, Vir Pazar, Tetovo, Ohrid, Prilep, Kavadarci, Štip, Demir Kapija, Devdjelija, Valandovo, Novi Dojran, | Scattle, Pendloton, - Akron, Fort Wayne, Youngstown, Toledo, South Bend, Binghamton, Rockford, Grand Rapids, Flint, Rochester N.York, Muskegon, |

| Stopnje | S F R J |
|---|---|
| 111 - 12o | |
| 121 - 13o | Rovtarica, Platak, |
| 131 - 14o | |
| 141 - 15o | Ribiška koča, |
| 151 - 16o | Dom na Komni, |
| 161 - 17o | |
| 171 - 18o | Rudno polje, Bjelašnica, |

TRAJANJE SNEŽNE ODEJE

/II - 4/

| Stopnje | S F R J |
|---|---|
| 0 | Poreč, Lun Gager, Biograd na moru, Kaštel Stari, Hvar, Palagruža, Vela Luka, Lastovo, Korčula, Orebić, Ston, Čibača, Budva, Bar, |
| 1 - 5 | Vipolže, Solkan, Koper, Ajdovščina, Ložé Vipava, Rovinj, Opatija, Rijeka, Kraljevica, Crikvenica, Fažana, Pula, Cres, Mali Lošinj, Veli Lošinj, Rab sinop., Pag, Zadar, Šibenik, Split Marjan, Opuzen, Dubrovnik, Grmada, Čapljina, Domanovići, Mostar, Lastva, Prokuplje, Hercegnovi, Podlhum, Titov Veles, Gevgelija, Novi Dojran, |
| 6 - 1o | Temenica, Sežana- Šmarje, Pazin, Senj, Knin, Mosor-Ljuvač, Sinj, Praznica, Imotski, Bileća, Titograd, Valandovo, Strumica, Radoviš, |
| 11 - 2o | Tolmin, Vir Pazar, Butelj, Struga, Ohrid, Trubaševo, Ržaničani, Erdželija, Kavadarci, Štip, Demir Kapija, Kočani, Delčevo, |
| 21 - 3o | Vinkovci, Zagreb-Bot.vrt, Palić, Novi Kneževac, Čoka, Vršac, Bela Crkva, Svetozarevo, Velimlje, Kumanovo, Skopje, Prilep, |
| 31 - 4o | Hotemež, Vel.Dolenci, Postojna Zalog, Stara vas, Križevci, Koprivnica, Botinec, Zagreb-Grič, Petrinja, Čazma, Bjelovar, Garešnica, Lipik, Slav.Požega, Slav.Brod, Đakovo, Osijek Neuman, Brestovac-Belje, Osijek sinop., Ilok, Zagreb-Maksimir, Livno, Sombor, Šid, Bački Petrovac, Vrbas, Srbobran, Novi Sad, Srem.Karlovci, Gladnoš /Maradik/, Stari Bečej, Senta, Zrenjamin, Kikinda, Srem.Mitrovica, Valjevo, Zemun-aerodrom, Beograd, Jarmenovci, Topola, Kragujevac, Smederevo, Smed.Palanka, Vel.Gradište, Rekovac, Kruševac, Aleksinac, Sokobanja, Niš, Pirot, Prizren, Kos.Mitrovica, Priština, Vranje, Leskovac, Vlastinci, Bosiljgrad, Grahovo, Nikšić, Jaša Tomić, Kriva Palanka, Resen, Bitola, Berovo, |
| 41 - 5o | Radlje, Pragersko, Ptuj, Zavrč, Mur.Sobota-Rakičan, Jeruzalem, Planina Rakek, Mokronog, Črnomelj, Brežice, Varaždin, Karlovac, Bistrac, Topusko, Božjakovina, Sisak, Lipovljani, Daruvar, Bos.Dubica, Drvar, Zenica, Tuzla, Bijeljina -N.Selo, Srem.Kamenica, Koviljača, Loznica, Šabac, Gor.Milanovac, Bukovič.banja, Žagubica, Bor, Negotin, Čačak, Kraljevo, Aleksandrovac, Kuršumlija, Čuprija, Dimitrovgrad, Peć, Uroševac, Predejane, Cetinje, Ivangrad, Ivanjica, Tetovo, |
| 51 - 6o | Bovec, Bled, Golnik, Ljubljana-Bežigrad, Ljubljana-Letal., Luče, Velenje, Celje-Medlog, Maribor-Tezno, Višnja gora, Kočevje, Novomesto-Kandija, Kostel, Ogulin, Bihać, Samski most, Banja Luka, Jajce, Bugojno, Doboj, Prozor, Sarajevo, Debeli lug, Titovo Užice, Užič.Požega, Novi Pazar, Vrnjačka banja, Zaječar, Bijelo Polje, Kruševo, |
| 61 - 7o | Šmartno Slov.Gor., Planina Sevnica, Sodražica, Otočac, Kalinovik, Rogatica, Plevlja, Mavrovo-Hanovi, |
| 71 - 8o | Trenta, Jezersko, Gomance, Balmo polje, Rakitna, Zalesina, Stubička gora, Plitvički Leskovac, Crkvice, Kolašin, |
| 81 - 9o | Stara Fužina, Sv.Miklavž, Parg, Delnice, Skrad, Drinić, Sokolac, Sjenica, Lazaropole, |
| 91 - 1oo | Sljeme, Butmir, Zlatibor, Ulasina, Kukavica, |
| 1o1 - 11o | Rateče-Planica, Planina Golica, Kupres, Mitrovac, na Tari, |



| Stopnje | S F R J | Z D A |
|---|---|---|
| 3433 | Drinak, | |
| 3638 | Mrzle Vodica | |
| 3709 | Risnjak, | |
| 4173 | Cetinje | |
| 5317 | Crkvice | |

| Stopnje | S F R J | Z D A |
|---|---|---|
| 16o1 - 17oo | Rovte, Senožeče, Topol Sv.Katarina, Trava, Ljubljana, Sv.Duh Solčava, Solčava, Stara Glažuta, Ajdovščina, Slavina, Cerknica, Snežnik, Banja Loka N.Sela, Rijeka, Budva, Cesarica, Stenica, Oštrelj, Klobuk | |
| 17o1 - 18oo | Vinegar, Rateče, Dovje - Mojstrana, Bled, Vrhnika, Jurešče, Titograd, Nevesinj, Bjelašnica, Ilidža, Stirad, Ogulin, Trsat, Zagvozd, Studena Orela, Rakitno, Divin, Tuskovići, Velinje, Crkvine, | |
| 18o1 - 19oo | Bukovje, Jezerski vrh, Kanal, St.Jošt, Vrhnika, Sv.Lovrenc - Neblo, Jesenice, Trata, Luče, Postojna, Ravb.k., Sodražica, Koč.reka, Opatija, Ljubinje, Zamet, Hreljin, Gomirje, Sušanj, Plavnice, Tuzi, Adrijevo, | Mount Washington, |
| 19o1 - 2ooo | Gor.Logatec, Leskovica, Planina Golica, Radovna, Železniki, Širi, Jezersko, Planina-Rakek, Kumbor, Hercegnovi, Vrgorac, | |
| 2oo1 - 21oo | Mašun, Soteska, Kranjska gora, Jablanica, Nikšić, Piškulja, Grabarje, Ravno, Žabljak, | |
| 21o1 - 22oo | Podljubelj, Sorica, Sv.Lucija, Idrija, Dražgoše, Ravna gora, | |
| 22o1 - 23oo | Bukovo, Podbrdo, Čepovan, Kolašin, Milanov vrh, Biljevine, | |
| 23o1 - 14oo | Lig, Danilov grad, Klana, Dobromani, | |
| 24o1 - 25oo | Virpazar, Gruda, | |
| 25o1 - 26oo | Boh. Bistrica, Trebnje | |
| 26o1 - 27oo | Livek, Predel, Mrzli studenec, Čeklići | |
| 27o1 - 28oo | Breginj, Soča, Gornje Mrakovo, | |
| 28o1 - 29oo | Kobarid, Kotor | |
| 29o1 - 3ooo | Bovec, Gomance, Fužine | |
| 3oo1 - 31oo | Krekovše, Štirovača | |
| 31o1 - 32oo | Izvir Savice, | |
| 32o1 - 33oo | Risan, Kotor-Škaljari, | |
| 333o | Grab-Zuboi, | |

| Stopnje | S F R J | Z D A |
|---|---|---|
| 1001 - 1100 | Cirkulane, Fram, Poljčane, Šečovlje, Šmarje Jelše, Valdoltra, Brežice, Sv.Duh Ostri vrh, Kostrivnica, Kapele p.Brežicah, Maribor, Sv. Trojica, Slov.G. Sv.Barbara Haloze, Strimjan, Koper, Rakovica,Krško, Rab, Korčula, Klenovnik, Banja Luka, Žepče, Kulen Vakuf, Bos.Petrovac, Drvar, Križovljan-Grad, Savudrija,Momjan, Sv.Vinčenat, Kalinovica, Nerezine, Novalja, Makarska, Sanski most, Tuzla, Kupres, Perister, Stari Majdan, Gor.Ribnik, Makljen sedlo, Jagodiči, Blato-Koručula, Ljubiš, Dečani, Jažince, Kosanica, Andrijevica, | Columbia, Norfolk, Cairo, Roanoke, Lynchburg, Washington D.C., Baltimore Custon H. Frederick, Atlantic City, Indianapolis, Philadelphia, Trenton, Harrisburg, Allentown. Nantucket, Youngstown, Hartford, Boston |
| 1101 - 1200 | Dekani, Kal St.Janž, Krška vas, Podkum, Prežganje, Vojnik, Celje, Lačko, Remšnik, Šentjur Celje, Čadram, Žusen, Buče p. Kozjem, Rog.Slatina, Kubed, Bela cerkev, Kostanjevica, Zadar, Knin, Drniš, Čapljina, Stolac, Topusko, Kalinovik, Udbina, Kaštel Belaj, Samobor, Ljevo Sredičko, Donja Stubiba, Mečenčani, Vrana-Stanici, Kistanje, Tragir, Bužin, Bos.Krupa, Vrtoče, Ključ, Vlasenica, Duvno, Trebević, Rostuša, | Greenville, Winston-Salem, Atlanta, Florence, Wilmington N.C., Memplis, Charlotte, Knoxville, Raleigh, Nashville, Lexington, Wilmington Del, Central Park New York, New Haven, Worcester, Pittsfield, Portland, |
| 1201 - 1300 | Črnomelj, Dvor, Krka, Litija, Lovrenc Poh., Tinje, Turje-Slatno, Velenje, Trbovlje I., Slovenj gradec, Sv.Jernej Muta, St.Ilj, Mislinja, St.Jošt, Kozjak, Loka Zid.most, Primskovo, Trebnje, Mokronog, Grm, Novo mesto, Adlešiči - Vel.Sela. Dubrovnik-Gruž, Pazin, Lepoglava, Vel.Kladuša, Bihać, Bos.Grahovo, Kladanj, Manjadvorci, Zvečaj, Kraljičin Zdenac, Obrovac, Metković, Janjina, Lušci Palanka, Ivan Planina, Bravsko, Pržiči, Šupica, Vikoč, Neum Klek, Sčepan Polje, Dljebuha, | Montgomery,Greeusboro, Bridgeport, Blue Hill WB, |
| 1301 - 1400 | Cerklje, Izlake, Abčica - Poljane, Rakstovec, Trnovo Ilir.Bistrica, Zelimlje, Vače, Nazaret, Topolšica,Ambrus, Starilog, Podgrad, Plonino, Skitača, Klis, Katum, Han Pijesak, Konjic, Tara-Sanatorium, Junik, | Birmingham, Rome, Chattanooga, Cape Hatteras, |
| 1401 - 1500 | Belo vode, Črni vrh, Polh.gr., Gorica, Gor.Razbor, Koprivna, Slivje, Škofjaloka, Kranj, Kamnik Zg.Tuhinj, Blagovica, Ribnica Poh., Komen, Škocjan, Vel.Račna, Sinji vrh, Kraljevica, Krk, Crikvenica, Senj, Sinj, Mostar, Gospić, Dragozetići, Vrlika, Muć, Dugo polje, Slano, Praznice, Široki Brijeg, Vlakovići, Prača Vrelo, Goransko, Stari Bar, Gusinje, | |
| 1501 - 1600 | Tomaj, Vipava, Tržič, Golnik, Dornberg, Podgrad, Rakitna, Babno polje, Ribnica Dolenj., Kočevje, Koprivnik Kočevje, Črvljivica, Sušak, Mlinište, Bistrica Vrelo, Šavnik, | Bristol, |
| 1601 - 1700 | Borovnica, Horjul, Hudivrh, Medvodje, Razdrto, | |

| Stopnje | S F R J | Z D A |
|---|---|---|
| 6ol - 7oo | Boljevacka, Berovo, Priština, Bitola, Radovište, Gavgalija, Delčevo, Gradište, Kratovo, Davidovac, Dobro Polje, Niška Banja, Svrljig, Đurakovac, Zlokućani, Velika Kruša, Kijevo, Suva Reka, Dule Han, Krpime, Podnjevo, Janjevo, Kačanik, Orlane, Bostane, Džep, Nova Breznica, Prnjalija, Nakolec, | |
| 7ol - 8oo | Vel.Dolenci, Hvar, Slav.Požega, Slav.Brod, Donji Miholjac, Osijek, Irig Bukovo /Negotin/, Jabukovac, Ilok, Brodjanci, Semeljci, Bonaster, Orašje, Višegrad, Bogatič, Ub, Lazarevac, Bukovička Banja, Prijepolje, Titovo Užice, Užič.Požega, Čačak, Kraljevo, Surdulica, Gosti, Rogot, Zlatovo, Gornjak-Manastri, Dobra, Donji Milanovac, Priboj-Lim, Samegnjevovar, Kruševo, Sokolac, Goražde, Plevlja, Struga, Ohrid, Sv.Naum, Prijepolje, Sjenica, Suvido, Rankovićevo, Blaževo, Vel.Pčelica, Ražanj, Krivi Vir, Grkinja, Vitanovac, Čuštica, Vrelo, Čelopek, Ribarice, Iztok, Dolac, Sijarinska Banja, Oruglica-Lipovica, Stari Glog, Klisura, Dolenci, Južni Brod, Prisad, Udovo, Kosturno, | Cleveland, Des Moines, Toledo, Detroit, Waterloo, Lansing, Grand Rapids, Buffals, Milwaukee, Rochester N.York, La Crosde, Rochester Min., Sault Ste.Marie, Maryuette, |
| 8ol - 9oo | Št.Ilj, Slov.Gorice, Tvrtkova, Veržej, Mur.Sobota Rak.II, Rakučan, Srednja Bistrica, Dolnja Lendava, Rovinj, Mali Lošinj, Split, Čakovec, Križevci, Bos.Gradiška, Modriča, Prnjavor, Prelog, Đurđevac, Novi Grad, Stara Gradiška, Divnlje, Dubrava, Novska, Grubišno polje, Grmja, Valjevo, Bijeljina, Vrnjačka banja, Tetovo, Debar, Travnik, Zenica, Borike, Bijelo, Valpovo, Umije, Susak, Lubenice, Drenovci, Skradin, Supetar, Subočica, Kiseljak, Rajlovać polje, Ivangrad, Kovačići Vrelo, Bukovi, Loznica, Gor.Banjani, Bliznak, Senjski Rudnik, Debeli Lug, Brodarevo, Nova Varoš, Rudno, Kaletinac, Kruševac, Aldinac, Petrovac, Đakoovički, Žur, Orahovac, Bukovica, Kažani, Nežilovo, | Pittsburgh, Akron, Dubruque, Springfild, Columbus, Fort Wayne, Sandusky, South Bend, Chicago, Erie, Bringhamton, Rockford, Albany, Burlington, |
| 9ol - 1ooo | Ormož, Strojna, Ptuj, Poreč, Šibenik, Đakovica, Prizren, Varaždin, Koprivnica, Zagreb-Grič, Sisak, Zabok, Orehovica, Zlatar, Podrute, Buzet, Šipan, Sesvete, Rugovica, Stančić, Garešnica, Čazma, Kutina, Lipik, Daruvar, Našice, Bos,Dubica, Prijedor, Koviljača, Ljubovija, Severin, Feričanci, Vodnjan, Cres, Punta Kriša, Sv.Betar-Ilovik, Kozarac, Komar, Zvornik, Čajetina, Ivanjica, Peć, Jajce, Pazarić, Butmir, Sarajevo, Srebrenica, Mošćanica, Foča, Čelebić, Zaolaka, Rudnik, Kašalj, Dojknici, Vlasina, Kovač, Sasa, Trnica, Sedlarevo, Konjsko, | Asheville, Dayton, Evansville, Luisville, Charleston, Huntington, Cincinnati, Parkersburg, Reading, Peoria, Burlington, Block Island, Scranton, Providence, Concord, Syracuse, Caribon, |

KOLIČINA LETNIH PADAVIN
The average Yearly precyaitation quantitias
/III - 3/

| Stopnje | S F R J | Z D A |
|---|---|---|
| 1o - 1oo | | Havre, Kalispell, Glasgov, Spokana, Seattle, Great Falls, Missoula, Helena, Yakima, Lewiston, Chemult Walla, Pendleton, Portland, Meacham, Sheridan, Eugene, Burns, Boise, Idaho Falls 46 W. Rosenburg, Casper, Pocatello, Lander, Sexton Summit, Medford, Mount Shasta, Cheyenne, Eureka, Bishop, Fresno, Bakersfield,- |
| 1o1 - 2oo | | Tatoosh Island , Crater Lake, Salem, Blue Kanyon, Mount Rainier - Longmire Ranger, — |
| 2o1 - 3oo | | Stampede Pass, Mount Rainier - Paradise Ranger, — |
| 3o1 - 4oo | | |
| 4o1- 5oo | Sv.Nikola /najsušji/, Skopje /drugi/, Titov Veles /tretji/, Gradsko, Poživalo, Kozbumar, | |
| 5o1 - 6oo | Senta, Zemun, Svilajnac, Paračin, Sokobanja, Prokuplje, Niš, Leskovac, Kraljevo, Breg, Martonoš, Crvenka, Temerin, Bač.Petrovo selo, Čurug, Mol, Vel.Kikinda, Pirot, Kos.Mitrovica, Gnjilana, Vranje, /Prilep, Štip, Demir Kapija, Kočane,/ Kovačica, Mladenovac, Kovin, Rača, Kragujevačka, Vel.Orašje, Vel.Popović, Brestovač. Banja, Raška, Leposavići, Paraćin, Stalać, Ribare, Petrovac-Prokup., Prokilovica, Knjaževac, Bela Palanka, Aleksinac, Domorcvce, Lebane, Vladičin Han, Topolčani, Zelenikovo, Makovo Kraljeve Štale, | Sioux City, |
| 6o1 - 7oo | Belje, Subotica, Apatin, Bač.Palanka, Bač.Petrovac, Srem.Mitrovica, Orbas, Širine, Puškaš, Pula, Žirje, Horgoš, Novi Kneževac, Bački Monoštor, Bogojevo, Novi Sad, Stari Bečej, Zrenjanin, Konak, Jaša Tomić, Obrenovac, Beograd, Plavna, Bajnok, Bačka Topola, Žabalj, Titel, Bašaid, Opovo, Rusko selo, Padina, Grooka, Pančevo, Smederevo, Smed.Palanka, Požarac, Bela Crkva, Vel.Gradište, Banat, Rankovićevo, Vladimirovci, Stara Pazova, Umka, Ralja, Topola-Varoš, Čumić, Brza Palanka, Zaječar, Kučevo, Kragujevac, Žagubica, Aleksandrovac, Rekovac, Vel.Plana, Flamunda, Lapovo, Petrovac-Požar., Golubac, Jošanica, Zlot.Tonda, Kruševac, Balušnica, Dimitrovgrad, Vučitru, Prečevo, Bosilj grad, Kriva Palan, Zaovine, Duga Poljana, Guča, Melaj, Užče, Vučkovica, Donji Krčin, Kuršumlija, | Saint Clond, Duluth, Muskegon, Green Bay, Minneapolis St.Paul, Alpana, Escanaba, International Falls, |

| Stopnja | S F R J |
|---|---|
| 1151 - 1200 | Skrad, Kraljevica, Jablanica, |
| 1201 - 1250 | Krk, Crikvenica, Senj, Budva, |
| 1251 - 1300 | Ravna gora, Rijeka, |
| 1301 - 1350 | Ljubljana, |
| 1351 - 1400 | Titograd, |
| 1401 - 1450 | Kumbor/Herc., Opatija |
| 1451 - 1500 | |
| 1571 | Virpazar, |
| 1747 | Trebinje, |
| 1775 | Danilovgrad |
| 1994 | Cetinje |
| 2016 | Mrzla Vodica |

KOLIČINA VEGETACIJSKIH PADAVIN
/III - 4 /

| Stopnje | S F R J |
|---|---|
| 51 - 100 | |
| 101 - 150 | |
| 151 - 200 | |
| 201 - 250 | |
| 251 - 300 | Sv. Nikola, |
| 301 - 350 | Kočane, Demir Kapija, Titov Veles, Skopje, |
| 351 - 400 | Štip, Prilep, Ohrid, Struga, Berovo, Kruševo, Bosiljgrad, Gujilane, Kos.Mitrovica, Prokuplje, |
| 401 - 450 | Sv.Naum, Delčevo, Gevgelija, Radovište, Bitola, Gostivar, Debar, Vranje, Priština, Vučitrn, Pirot, Leskovac, Niš, Sokobanja, Paračin, Svilajnac, Zaječar, Brza Palanka, Pančevo, Zemun, Zrenjanin, Senta, Stari Bečej, |
| 451 - 500 | Plevlja, Goražde, Kriva Palanka, Dimitrovgrad, Bubušnica, Kruševac, Rekovac, Aleksandrovac, Prijepolje, Kragujevac, Tetovo, Zabukovac, Bukovo, Negotin, Vel.Gradište, Bela Crkva, Požarevac, Smed.Palanka, Smederevo, Grocka, Beograd, Obrenovac, Jaša Tomić, Konak, Novi Sad, Vrbas, Srem.Mitrovica, Bački Petrovac, Apatin, Subotica, |
| 501 - 550 | Ivangrad, Bijelo polje, Sokolac, Bjelašnica, Surdulica, Kraljevo, Čačak, Užič.Požega, Žagubica, Kučevo, Bukovič.banja, Vršac, Bačka Palanka, Belje, Osijek,Rovinj, |
| 551 - 600 | Perister, Borike, Butmir, Pazarić, Kupres, Zenica, Travnik, Drvar, Peć, Vrnjačka banja, Titovo Užice, Čajetina, Irig, Donji Miholjac, Prnjavor, Slav.Brod, Slav.Požega, Hvar, |
| 601 - 650 | Udbina, Čazma, Kalinovik, Sarajevo, Bos.Petrovac, Bos.Gradiška, Bos.Dubica, Modriča, Bijeljina, Valjevo, Djakovica, Poreč, |
| 651 - 700 | Jajce, Bos.Grahovo, Ivanjica, Koviljača, Prizren, Prijedor, Daruvar, Lipik, Kutina, Sisak, Zagreb, Koprivnica, Križevci, Čakovec, Split |
| 701 - 750 | Sanski Most, Kulan Vakuf, Zvornik, Ljubovija, Varaždin, Korčula, Šibenik, Mali Lošinj, |
| 751 - 800 | Ilidža, Ivan Planina, Kladanj, Tuzla, Žepče, Banja Luka, Našice, Gospić, |
| 801 - 850 | Bihać, Stolac, Čapljina, Topusko, Klenovnik, Drniš, |
| 851 - 900 | Nevesinje, Vel.Kladuša, Knin, Zadar, Rab, Pazin, |
| 901 - 950 | Lepoglava, Dubrovnik, |
| 951 - 1000 | |
| 1001 - 1050 | Crvljivica, |
| 1051 - 1100 | Ogulin, Sinj, |
| 1101 - 1150 | Kolešin, Nikšić, Mostar, |

| Stopnja | S F R J | Z D A |
|---|---|---|
| 1o1 - 11o | Lepoglava 6, Ogulin 7, Kladanj 7,8, Gomilje 7, Biljevine 7,Przići 7, Bistrica Orels 7, Cerklje7, Črni vrh Polhov gr.7, Fram 7, Horjul 7, Litija 7, Razdrto 7, Slivje 7, Jelše, Vipava 7, Sv.Duh Ostri vrh, Žužem 8, Buče pri Kozjem 7, Rogaška Slatina 7, Podgrad 7, Slavina 7, Vel.Račna 7, Koč.reka 7, Kostanjevica 7, | Montgomery 8, Birmingham 6, Rome 8, Chattanooga 8, Knoxville 8, Norfolk 6, Roanake 6, Washington Del.6, Philadelphia 7, Allentown 6, |
| 11o - 12o | Skrad 7, Fužine 7, Han Pijesek 8, Borovnica 7, Gomance 7, Izlake 7, Kanal 7, Mašna 7, Roote 7, Senozeče 7, Turje-Slatno 6, Vojnik 6, Sv.Lovrenc-Neblo 7, Golnik 7, Kranj 7, Ljubljana 7, Zgr. Tuhinj 7, Vače 7, Trbovlje I.7, Celje 7, Laško7, Remšnik 7, Šentjur Celje 6, Vrhnika 7, Cerknica7, Rakitna 7, Sodražica 7, Prinskovo 7, | Florence 8, Raleigh 6, |
| 121 - 13o | Ravna gora 7, Milanov vrh 7, Tara-Sanotorium 8, Bukovje 7, Gor.Logatec 7, Koprivna 7, Lovreno/Poh.7, Jesenice 7, Trata 7, Kamnik 7, Blagovica 7, Nazaret 7, Slovenj gradec 7, Postojna Ravnik 7, Bled7, Sorica 7, Soteska 7, Št.Jošt Vrhnika, Tinje 6,7, Topol Sv.Katarina, Velenje 7, Železniki 7, Dovje-Mojstrana 7, Št.Ilj Mislinja 6, Št.Jošt.Kozjak7, Ribnica Pohorje 6, Čadram 6, Planina-Rak.7, | |
| 131 - 14o | Drinak 7, Bela vode 6, Gor.Razbor 7, Leskovica 7, Medvodje 7, Radovna 7, Vintgar 7, Žiri 7, Čepovan 7, Idrija, Dražgoše 7, Tržič 7, Topolšica 7, Sv.Jernej Muta 7, | |
| 141 - 15o | Krekovše 7, Lig 7, Planina Golica 7, Podbrdo 7, Rateče 7, Sv.Luvija 7, Kranjska gora 7, Hoh.Bistrica 7, Sv.Duh Solčava 7, Solčava 7, Luče 7, | |
| 151 - 16o | Risnjak 7, Hudi vrh 7, Jezerski vrh 7, Jezersko7, Stara Glažuta 7, | Mount Washingon 7, |
| 161 - 17o | Mrzla Vodica 7, Bukovo 7, Livek 7, Podljubelj 7, | |
| 171 - 18o | Bovec 7, Kobarid 7, Soča 7, Izvir Savice 7, | |
| 181 - 19o | Predel 7, Breginj 7, Mrzli studenec 7, | |

| Stopnja | S F R J | Z D A |
|---|---|---|
| 61 - 7o | Opatija 7, Rijeka 7, Kraljevica 7, Crikvenica 7, Senj 7, Čazma 7, Slav.Požega 7, Našice 7, Dol. Miholjac 7, Koviljača 7, Vel.Greda 8, Užič.Požega 8, Čačak 8, Kraljevo 7-8, Bos.Dubica 7, Bijeljina 7, Bos.Petrovac 7, Bos.Grahovo 7-8, San.Most 8, Jajce 7, Travnik 7, Zenica 7, Ivan Planina 7, Borike 8, Gospič 8, Zlatar 8, Savudrija 8, Buzet 8, Koštel Belaj 8, Dragozetići 7, Zamet 7, Trsat 7, Sušak 7, Sesvete 7, Međenđani 7, Dubrava 7, Garešnica 7, Novska 8, Valpovo 7, Brodjanci 6, Sušanj 8, Gunja 7, Vrlika 7, Vrtoče 7, Stari Majdan 7, Komar 7, Bogojevo 8, Bukovi 7, Lazarevac 7, Gornji Banjani 7, Rudnik 7, Gornjak Manastir 8, Bliznak 8, Golubac 7, Dobra 7, Debeli lug 7-8, Brodarevo 8, Sjenica 7, Rudno 9, Rankovićevo 7,8, Kruševica 8, Aldinac 7, Janžince 8, Goransko 7, Kovgč 8, Kosanica 7, Šavnik 8, Valdoltra 8, Srednja Bistrica 6, | Sioux City 8, Noshville 8, Cairo 7, Evansville 7, Fort Wayne 8, Nantucket 7, Cleveland 8, Sandusky 8, Chicago 7, Erie 8, Detroit 8, Rochester N.York 7, Portland 8, Eskanaba 6, Marquette 8, |
| 71 - 8o | Pazin 7, Čakovec 6, Križevci 8, Koprivnica 7, Topusko 8, Zagreb:Grič 7, Sisak 7, Kutina 7-8, Lipik 7, Daruvar 7, Vel.Kladuše 7, Bihać 7, Zvornik 8, Valjevo 7, Tit.Užice 7, Vrnjačka Banja 8, Zabok 7, Podrute 7, Prelog 6-7, Đurđevac 7, Klana 7, Hreljon 7, Kalinovica 7, Lujevo Sredičko 7, Rugvica 7, Stančić 7, Grubišno Polje 8, Struica 7, Bužin 7, Bos.Krupa 7, Lušci Palanka, Bravsko 7, Gornji Ribnik 7, Mlinište 7, Sibošica 7-8, Vlasenica 8, Rakitno 8, Trebević 7, Zavlaka 7, Senjski Rudnik 8, Nova Varoš 8, Vlasina 7, Crkvice 7, Dekani 7, Rakitovec 7, Šent Ilj, Slov.gor.7, Trdkova 6, Dolnja Lendava 7, Strunjan 7, Koper 7, | Greenville 6, Dayton 8, Pittsburgh 8, Duluth 7, Luisville 7, Baltimore Custom H.6, Atlantic City 6, Springfields 8 Columbus 8, Peoria 8, Des Moines 7, South Bend 7, Providence 7, Concord 7, Boston 7, Syracuse 6, Burlington 8, |
| 81 - 9o | Krk 7-8, Klenovnik 7, Varaždin 7, Žepče 7, Ljubinja 8, Čajetina 8, Ivanjica 8, Croljivica 7, Orehovica 6, Križoljan-Grad 6, Samobor 7, Kraljičin Zdenac 7, Donja Stubica 6, Grabanje 7, Prača Vrelo 7, Ljubiš 8, Gornja Morakovo 8, Cirkulane 7, Črnomelj 7, Dvor 7, Gorica 7, Kal Št.Janž 7, Občica Poljane 7, Tomaj 7, Trnovo - Ilir.Bistrica 7, Želinje 7, Brežice 7, Kapele pri Brežicah 7, Sv.Barbara Halloze 7, Veržej 7, Rakičan I.7, Vel.Dolenci 6, Komen 7, Doruberg 7, Kubed 7, Skocijan 7, Babno polje 7, Kočevje 7, Banjaloka -Nova Sela 7, Mokronog 7, Bela Cerkev 7, Adlešiči - Vel.Sela 7, Radovica 7, Krško 7, | Asheville 6, Akron 8, Dubruque 8, Saint Clond 7, Atlanta 8, Columbia 6, Wilmington N.C. 6, Lexington 8, Charleston 6, Huntington 8, Washington D.C. 6, Cincinati 8, Indianapolis 8, Burlington 7, Youngstown 8, Binghamton 8, Rockford 7, Albany 8, Rochester Min.7, Caribou 8, |
| 91 - 1oo | Tuzla 7, Bjelašnica 7, Zvečaj 7, Prnjkulja 7, Stirovača 7, Oštrelj 7, Srebrenica 7, Jagodići, Žabjak 8, Krka 7, Krška vas 7, Ormož 6,7, Podkum 7, Poljčane 6, Prežganje 7, Strojna 7, Trava 7, Škofja Loka 7, Loka Zid.most 7, Kostrevnica 7, Maribor 7, Ptuj 7, Sv. Trojica Slov.Gor.6, Mur.Sobota Rak.II. 7, Ajdovščina 7, Jurežče 7, Snežnik 7, Ribnica Dolenj. 7, Ambrus 7, Starilog 7, Trebnje 7, Koprivnik Kočevje 7, Grm , Novo mesto 7, Sinji vrh 7, Podgrad 7, | Winston-Salen 6, Charlotte 6, Cape Hatteras 6, Greeusboro 6, Bristol 6, Lynchburg 6, Parkersburg 7, Frederick 7, Trenton 7, Reading 6, Central Park New York 6, Bridgeport 7, New Haven 7, Scranton 6, Hartford 6, Blue Hill WBF, Worcester 7, Waterloo 8, La Crosse 6, International Falls 7, |

KOLIČINA PADAVIN NAJSUŠJEGA POLETNEGA MESECA

The average precipitation quantities of the drmestr summer month

/III - 5/

| Stopnja | S F R J | Z D A |
|---|---|---|
| 0 | | Yakima 8, Walla Walla 7, Pendleton 7, Evgene 7, Boises, Rosenburg 7, Medford 8, Mount Shasta 7, Eureka 7, Blue Kanyon 7, Bishop 8, Fresno 8, Bakersfield 7, — |
| 1 - 5 | | Havre 8, Tatosh Island 8, Kalispell 8, Glasgow 8, Spokane 7, Seattle 7, Great Falls 7, Stampede Pags 7, Crater Lake 8, Missoula 8, Helena 8, Lewiston 7, Chemult 8, Portland 7, Meacham 7, Salen 7, Sheridan 8, Burns 8, Idaho Falls 46 W7, Casper 8, Pocatello 8, Lander 8, Sexton Summit, Cheyenne 6, Mount Rainier - Paradise Ranger 7, Mount Rainer - Longmire Ranger 7, — |
| 6 - 1o | Blato - Korčula 7, | |
| 11 - 2o | Struga 7-8, Ohrid 7, Titov Veles 7, Nikola 7, Demir Kapija 8, Šipan 7, Stari Bar 7, Gradište 7, Južni Brod 7, Gradsko 7, Konjsko 8, Makoleo 8, | |
| 21 - 3o | M.Lošinj 7, Split 7, Hvar 7, Dubrovnik-Gruž 7, Kumbor Her.7, Budva 7, Vsipazar 7, Zakovice 7, Prešcvo 8, Debar 7, Gostivar 8, Kruševo 8, Berovo 8, Skopje 7, Prilep 7, Stip 7, Kočane 8, Radovište 8, Gevgelija 8, Sv.Nanm 8, Divnlje 7, Ljubenice 7, Bonaster 7, Žaje 7, Trogir 7, Klis 7, Supetar 7, Makarska 7, Janjina 7, Slano 7, Čelopek 7, Prahovao 7, Kotor 7, Buljarica 7, Trnica 7, Nova Breznica 7, Topolčani 8, Zdenkovo 7, Prisad 8, Makovo 8, Prnajlija 7, Udovo 8, Kozbunar 8, Kosturno 8, Kraljeva Štale 7, | |
| 31 - 4o | Rovinj 7, Zadar 7, Šibenik 8, Korčula 7, Mostar 7, Capljina 8, Stolac 7, Danilovgrad 7, Obrenovac 7, Brza Planka 7, Prokuplje 7, Niš 7, Leskovac 8, Babuš 7, Pirot 7, Kos.Mitrovica 7, Vučitru 7, Gnjilane 7, Vranje 8, Bosiljgrad 8, Tetovo 7, Bitola 7, Pula 8, Unije 7, Susak 7, Cres 7, Punta Križa 7, Sv.Petar - Ilovik 7, Obrovac 7, Skradin 8, Katuni 7, Vrgorna 7, Gruda 7, Praznice 7, Klobuk 7, Široki Brijeg 8, Vlchovič 7, Ravno 7, Neum Klek 7, Mol 8, Mladenovac 8, Rača Kragujevačka 7, Vel. Popovič 8, Leposavič 8, Ribare 8, Prčilovica 8, Boljevac 7, Dobropolje 7, Svrljig 7, Bela Palanka 7, Junik 7, Dečani 7, Vrelo 7, Petrovac-Đakovački 7,8, Istok 7, Dolac 7, Žur 7, Vel.Kruša 8, Suva Reka 8, Kačanik 8, Bostane 8, Domorovce 7, Novo Selo, Pčinjsko 8, Kotor-Škaljari 7, Plavnica 7, Tuzi 7, Kratovo 7, Rostuša 7, Dolenci 7, Kažani 7, Nežilovo 8, | |

| Stopnja | S F R J | Z D A |
|---|---|---|
| 41 - 50 | Rab 8, Knin 7, Drinš 8, Ljubinje 7, Titograd 8, Prizren 7, Novi Sad 7, Izig 7, Senta 7, Zemun 7, Pančevo 7, Smederevo 7, Smed.Palanka 7, Požarevac 8, Bukovo N.8, Jabukovac 8, Bukvič.Banja 7, Svilajnec 8, Prijepolje 7, Rekovac 8, Kruševac 8, Paračin 8, Sokobanja 8, Dimitrovgrad 7-8, Peć 8, Priština 6-7, Kriva Palanka 8, Drvar 7, Kupres 7, Nevesinje 7, Butmir 7, Goražde 7, Cetinje 7, Nikšić 7, Ivangrad 8, Perister 7, Delčevo 8, Plonim 7, Ilok 7, Smeljci 7, Vodujan 6-8, Nerezine 7, Vrana-Stanici 7, Novalja 7, Kistanje 8, Dugo polje 7, Zagvord 8, Metković 7, Orušje 7, Šujica 7, Duvno 7, Kiseljak 7, Foča 7, Višegrad 7, Turkovići 7, Dobromani 7, Grab-Zubci 7, Kraljev Breg 7, Horgoš 7, Martonoš 7, Temerin 6, Žabalj 7, Bač.Petrovo selo 8, Vel.Kikinda 7, Kovačica 7, Padina 7, Bogatic 7, Vladimirci 7, Stara Pazova 7, Ralja 7, Topola-Varoš 7, Kovin 8, Vel.Plana 8, Vel.Orašje 8, Lapovo 8, Zlatovo 6, Zlot 8, Brestovač.Banja 8, Tanda 7, Prije polje 7, Melaj 7, Ušće 8, Raška 8, Vučkovica 7, Blažovo 8, Donji Krčin 8, Kuršumljija 8, Paraćin 8, Stalać 7, Petrovac -Prokup.8, Krivivir 8, Davidovac 7, Grkinja 7, Niška Banja 8, Knjaževac 7, Zlokućani 7, Kijevo 8, Dule Han 7, Krgime 8, Podujevo 8, Janjevo 8, Orlano 8, Aleksinac 8, Lebane 8, Vladičin Han 8, Džep 8, Stari Glog 8, Risan 7, Čeklići 7, Andrijevo 8, Gusinje 7, Bukovica 8, Sasa 8, Sedlarevo 8, | Lansing 7, Muskegon 7, |
| 51 - 60 | Poreč 7, Sinj 8, Slav.Brod 7, Bos.Gradiška 7, Banja-Luka 7, Prijedor 8, Modriča 7, Prujavor 7, Osijek 7, Belje 8, Subotica 8, Apatin 7, Bač.Palanka 6, Bač. Petrovac 7, Srem.Mitrovica 7, Vrbas 6, Stari Bečej 8, Zrenjamin 7, Konak 7, Jaša Tomić 8, Vršac 7, Beograd, Grocka 8, Bela Crkva 7, Zaječar 7, Kragujevac 7, Žagubica 8, Aleksandrovac 8, Surdulica 8, Kučevo 7, Kulen Vakuf 7, Jablanica 7, Pazarić 7, Ilidža 7-8, Sarajevo 7, Kalinovik 7, Sokolac 7, Plevlja 7, Bijelo Polje 8-9, Udbina 8, Novi grad 7, Nomjan 7, Sv. Vinčenat 7, Manjadvorci 7, Stara Gradiška 7, Severin 7, Feričanci 7, Širine 8, Pučkaš 8, Skitača 7, Cesarica 7, Dronovci 7, Muć 8, Kozara 7, Studena Vrela 7, Makljen sedlo 7, Konjic 7, Divin 7-8, Rajlovac 7, Kovačići Vrelo 7, Mošćanica 7, Vlkoč 7, Čelebić 7, Novi Kneževac 7, Bački Monoštor 7-8, Plavna 7, Bajmok 7, Crvenka 8, Bačka Topola 8, Čurug 6, Titel 7, Basind 7, Opovo 7, Rusko selo 7, Banat,Rankovićevo , Ub 7, Umka 7, Ćumić 8, Flamunda 7, Rogat 8, Petrovac-Požar 7, Jošanica 8, Donji Milanovac 7, Zaovine 6, Priboj-Lim 8, Semegnjevo 8, Suvido 7,Duga Poljana 8, Čustica 7, Guča 7, Kašalj 7, Velika Pčelica 8, Ražanj 8, Kaletinac 7, Vitanovac 7, Dojkinci 7, Ribarice 7, Sijarinska Banja 8, Okruglica-Lipovica 8, Klisura 7, Šćepan Polje 7, Bijlo Polje 8,Velimlje 7, Crkvine 7, Andrijevica 7, Bjeluka 7, Sečovlje 8, | Memphis 8, Harrisburg 7, Block Island 7, Toledo 7, Pittsfield 8, Grand Rapids 7, Buffalo 7, Milwankee 7, Green Bay 7, Minneapolis St.Paul 7, Alpena 7, Sault Ste.Marie 8, |

| Stopnje | S F R J | Z D A |
|---|---|---|
| 83 - 84 % | Ljubljana-letal., Grbin Litija -Gomance, Babno polje, Višnja gora, Slov.vas,Mokronog, Platak, Petrinja, Kupres, Bijelina-N.Selo, Kopaonik, | |
| 85 - 86 % | Ribniška koča, Delnice, Bjelašnica, | Tooth Island, — Mount Washington, |

| Stopnje | S F R J | Z D A |
|---|---|---|
| 71 - 72 % | Sežana, Loče, Vipava, Zagreb-Grič, Ilok, Pula, Mali Lošinj, Ston, Livno, Prozor, Čapljina, Sarajevo, Vršac, Dimitrovgrad, Peć, Prizren, Priština, Plevlja, Crkvice, Vir Pazar, Tetovo, Skopje, Gevgelija, Novi Dojran, | Meacham, Salem, Oakland, — Akron, Montgomery, Luisville, Indianapolis, Fort Wayne, Youngstown, Toledo, South Bend, Binghamton, Lansing, Grand-Rapids, Milwaukee, Roohester N.York, Green Bay, Caribou, |
| 73 - 74 % | Boveo, Planina Golica, Vipolže, Tadar, Čibača, Lastva, Srem.Karlovci, Valjevo, Zemun-aerodrom, Smed.Palanka, Vel.Gradište, Bor, Negotin, Aleksinac, Vranje, Kumanovo, Struga, Resen, Ržaničani, | Olympia, — Duluth, Mansfield, Buffalo, Muskegon, Alpena, Escanaba, |
| 75 - 76 % | Poreč, Ogulin, Stubička gora, Lipovljani, Daruvar, Bihać, Drvar, Butmir, Palić, Novi Sad, Gladnoš /Maradik/, Čoka, Zrenjamin, Koviljača, Kragujevac, Kovin, Bela Crkva, Zlatibor, Kraljevo, Čuprija, Sokobanja, Zaječar, Pirot, Dragaš, Kruševac, Surdulica, Bosilj grad, Jaša Tomić, Cetinje, Debar, Lazaropole, Kruševo, Tubarevo, Berovo, | |
| 77 - 78 % | Rateče - Planica, Tolmin, Trenta, Maribor-Tezno, Vel.Dolenci, Varaždin, Rovinj, Pazin, Karlovac, Bistrac, Lučko, Božjakovina, Sisak, Slav.Brod, Đakovo, Brestovac-Belje, Vinkovci, Fažana, Gospić-sinop., Palagruža, Zagreb-Bot. vrt, Banja Luka, Jajce, Zenica, Tuzla, Novi Kneževac, Bački Petrovac, Vrbas, Srbobran, Srem.Kamenica, Kikinda, Loznica, Šabac, Pančevo, Lušara, Sjenica, Novi Pazor, Vrnjačka Banja, Kuršumlija, Kruševac, Bujanovac, Leskovac, Predejane, Cervenka - Panč.rit, Bijelo polje, Kolašin, Butelj, | Cape Hatteras, Sault Ste.Marie, |
| 79 - 8o % | Bled, Jezersko, Ljubljana-Bež. Šmartno Slov. gor., Hotemež-Radeče, Celje-Medlog, Planina Sevnica, Rog.Slatina, Mur.Sobota-Rak., Jeruzalem, Postojna Zalog, Planina-Rakek, Križevci, Koprivnica, Rog, Stubičke Toplice, Sljeme, Čazma, Bjelovar, Garašnica, Osijek Neuman, Zagreb-Maksimir, Bos.Dubica, Orašje, Dimić, Sanski most, Bugojno, Prujavor, Doboj, Gacko, Sokolac, Sombor, Šid, Stari Bečej, Senta, Srem.Mitrovica, Žagubica, Užič.Požega, Vlasima, Kukavica, | Walla Walla, Astoria, —Portland |
| 81 - 82 % | Stara Fužina, Voglje, Šmarna,gora, Velenje, Radlje, Vrhnika, Kočevje, Novo mesto-Kand., Krško, Brežice, Kostel, Zalesina, Skrad, Botinec, Topusko, Lipik, Slav.Požega, Pliv. Leskovac, Derventa, Teslić, Mavča, Brčko, Kalinovik, Goražde, Rogatica, Prijedor, Mihovac Tara, Čačak, | |

LETNA ZRAČNA VLAGA

The average annual air humidity

/IV - 1/

| Stopnje | S F R J | Z D A |
|---|---|---|
| 45 - 46 % | | |
| 47 - 48 % | | Bakersfield, — |
| 49 - 5o % | | Casper, Lander, Cheyenne,— |
| 51 - 52 % | | Great Falls, Burns, Boise, -, |
| 53 - 54 % | | Pocatello, Fresno, -- |
| 55 - 56 % | | Helena, Yakima, Portland, Sheridan, Burbank — |
| 57 - 58 % | | Glasgow, Monnt Shasta, — |
| 59 - 6o % | Split Marjan, | Spokane, — |
| 61 - 62 % | Senj, Šibenik, Imotski, Mostar, | Medford, — |
| 63 - 64 % | Rijeka, Titograd, | Winston-Salem, Roanoke, Washington D.C., Harrisburg, Newark, La Guardia Field, Central Park New York, Bridgeport, Concord, |
| 65 - 66 % | Kraljevica, Lun Gager, Rab sinop., Knin, Kaštel Stari, Mosor-Ljuvač, Dubrovnik, Kriva Planka, | Missoula, — Greenville, Sioux City, Baltimore Customtt.,Philadelphia, Worcester, Boston, |
| 67 - 68 % | Crikvenica, Hvar, Opuzen, Korčula, Domanovići, Hercegnovi, Bar, Kavadarci, Štip, Demir Kapija, | Asheville, Atlanta, Birmingham, Columbia, Florence, Chattanooga, Memphis, Charlotte, Knoxville, Raleigh, Greensboro, Nashville, Bristol, Lynchburg, Richmond, Charleston, Cincinnati, Baltimore, Parkersburg, Springfield, Williamsport, Schranton, Providence, Chicago, Hartford, Detroit, Albany, Syracuse, Madison, La Crosse, Minneapolis St.Paul, |
| 69 - 7o % | Solkan, Koper, Ajdovščina -let., Osijek-sinop., Cres, Pag, Biograd, Sinj,Vela Luka, Lastovo, Osebić, Lištica, Bileća, Beograd, Niš, Budva, Nikšić, Ulcinj, Ohrid, Bitola, Prilep, Kočani, Valandovo, | Seattle, — Dayton, Pittsburgh, Dubuque, Saint Cloud, Rome, Norfolk, Cairo, Lexington, Evansville, Atlantic City, Wilmington Del., Columbus, Allentown, Peoria, Burlington, Namtucket, New Haven, Cleveland, Moline, Des Moines, Rockford, Blue Hill WB, Detroit Willow Run, Flint, Rochester Min.,Burlington, Marquette, International Falls, |

| Stopnje | S F R J | Z D A |
|---|---|---|
| 75 - 76 % | Planina Golica, Bled, Velenje, Radlje, Celje-Medlog, Postojna, Zalog, Babno polje, Novo mesto, Kand., Koprivnica, Zalesina, Petrinja, Lipik, Virovitica, Bijelina - N. Selo, Bjelašnica, Mihovac, Tara, | Montgomery, Charlotte, |
| 77 - 78 % | Stara Fužina, Voglje, Ljubljana-letal., Rog.Slatina, Višnja gora, Brežice, Stara vas, Kostel, Delnice, | Astoria, — |
| 79 - 8o % | Jezersko, Bibniška koča, | |
| 81 - 82 % | | Cape Hatteras, Nontucket, |
| 83 - 84 % | | |
| 85 - 86 % | | Tatoosh Island, — |
| 87 - 88 % | | Mount Washington, |
| 89 - 9o % | | |

| Stopnje | S F R J | Z D A |
|---|---|---|
| 63 - 64 % | Koper, Lože Vipava, Ilok, Pula, Veli Lošinj, Paliś, Vršac, Zemun - aerodrom, Bor, Zlatibor, Kraljevo, Prokuplje, Pirot, Dragaš, Bosiljgrad, Jaša Tomić, Plevlja, Budva, Ulcinj, Lazaropole, Trubarevo, Perovo, | Winston - Salem, Dayton, Columbia, Knoxville, Washington D.C., Philadelphia, Harrisburg, Newark, Central Park New York, Hartford, Worcester, Albany, Lansing Grand Rapids, Flint, Syracuse, Rochester N.York, Madison, Rochester Min., Mineapolis St.Paul, |
| 65 - 66 % | Tolmin, Ajdovščina - letal., Opatija, Stubička gora, Zadar, Biograd, Čibača, Bihać, Dvor, Butmir, Kalinovik, Gacko, Vrbas, Srbobran, Novi Sad,Srem.Karlovci, Gladnoš /Maradik/, Čoka, Zrenjamin, Kikinda, Valjevo, Smed.Palanka, Bela Crkva, Vel.Gradište, Aleksandrovac, Aleksinac, Sokobanja, Zaječar, Surdulica, Crvenka - Panč.rit, Bar, | Greenville, Saint Cloud, Birmingham, Chattanooga, Memplis, Greensboro, Nashville, Roanoke, Evansville, Cincinnati, Baltimore, Parkersburg, Baltimore Custom H., Wilmington Del., Springfield, Columbus, Peoria, Fort Wayne, Willimsport, Scranton, Moline, Des Moines, Toledo, South Bend, Concord, Burlington, International Falls, |
| 67 - 68 % | Sežana, Poreč, Platak, Ogulin, Đakovo, Osijek-sinop., Vinkovci, Gospić-sinop., Drinić, Novi Kneževac, Šid, Srem.Kamenica, Kovilјača, Bučevo, Kragujevac, Kovin, Sušara, Sjenica, Novi Pazar, Kuršimljija, Kruševac, Čuprija, Bujanovac, Leskovac, Predajane, Kukavica, Bijelo polje, Butelj, Debar, Mavrovo - Hanevi, | Oakland, — Ashville, Pittsburgh, Akron, Dubuque, Florence, Rome, Raleigh, Bristol, Norfolk, Lynchburg, Richmond, Lexington, Atlantic City, Indianapolis, Burlington, Bridgeport, Youngstown, Providence, Bringhamton, Rockford, Boston, Milwaukee, Muskegon, La Crosse, Green Bay, Marquette, |
| 69 - 7o % | Maribor-Tezno, Vipolže, Karlovac, Sisak, Lipovljani, Daruvar, Slav.Brod, Osijek Neuman, Brestovac -Belje, Pažana, Banja Luka , Jajce, Bugojno, Teslić, Zenica, Tuzla, Rogatica, Sombor, Bač.Petrovac, Stari Bečej, Senta, Laznica, Čačak, Vrnjačka banja, Kos. Mitrovica, Vlasina, | Duluth, Charleston, Allentown, Cleveland, Blue Hill WB, Alpena, Caribou, |
| 71 - 72 % | Rateče - Planica, Podbrezje, Ljubljana-Bež., Hotemež-Radeče, Zavrč, Vel.Dolenci, Varaždin, Rovinj, Pazin, Parg, Skrad, Bistrac, Lučko, Stubičke Toplice, Hrvat.Dubica, Gazrešnica, Plitv. Leskovac, Palagruža, Zagreb-Maksimir, Bos.Dubica, Sanski most, Prujevor, Doboj, Modriča, Brčko, Sokolac, Srem.Mitrovica, Šabac, Žagubica, Užič.Požega, Kopaonik, Kolašin, | Wilmington N.C., Luisville, Buffalo, Portland, Escanaba, Sault Ste. Marie, |
| 73 - 74 % | Bovec, Šmartno Slov.gor. Planina Senica, Mur.Sobota-Rak., Jeruzalem, Kočevje, Križevci, Sljeme, Botinec, Topusko, Božjakovina, Čezma, Bjelovar, Slav.Požega, Derocuta, Orašje, Kupres, Mahoča, Goražde, Debeling, | Atlanta, |

ZRAČNA VLOGA NAJMANJ VLAŽNEGA POLETNEGA MESECA
The air humidity of the driest summer month
/II - 2/

| Stopnje | S F R J | Z D A |
|---|---|---|
| 25 - 26 % | | |
| 27 - 28 % | | Boise, Pocatello, Bakersfield, — |
| 29 - 3o % | | Burns, — |
| 31 - 32 % | | Pendleton, — |
| 33 - 34 % | | Casper, Lander, Fresno, — |
| 35 - 36 % | | Spokane, — |
| 37 - 38 % | | Missoula, Yakima, — |
| 39 - 4o % | | GreatFalls, Sheridan, Mount Shasta, Cheyenne,— |
| 41 - 42 % | | Glasgow, Helena, Medford, — |
| 43 - 44 % | | |
| 45 - 46 % | Titograd, | |
| 47 - 48 % | Split Marjan, Imotski, Mostar, | |
| 49 - 5o % | Mosor Ljuvač, Titov Veles, Kavadarci, Štip, | |
| 51 - 52 % | Šibenik, Nikšić, Bitola, Prilep, Demir Kapija, | |
| 53 - 54 % | Senj, Kaštel Stari, Ston, Lištica, Kriva Palanka, Skopje, Ržanićani, Kočani, Geogalija, Valandovo, | |
| 55 - 56 % | Lun Gager, Knin, Opuzen, Domanovići, Bileća, Prizren, Vir Pazar, Ohrid, Erdželija, | Salem, Burbank — |
| 57 - 58 % | Rijeka, Rabsinop., Sinj, Vela Luka, Dubrovnik, Čapljina, Niš, Priština, Reseu,Novi Dojran, | |
| 59 - 6o % | Kraljevica, Cres, Mali Lošinj, Hvar, Lastovo, Korčula, Orebić, Livno, Prozor, Beograd, Negotin, Peć, Vranje, Hercegnovi, Crkvice, Cetinje, Tetovo, Kumanovo, | Seattle, Portland, — Sioux City, Detroit Willow Run, Detroit |
| 61 - 62 % | Crikvenica, Zagreb-Grič, Sarajevo, Lastva, Dimitrovgrad, Uroševac, Prešcvo, Vlasotinci, Struga, Kruševo, | Olympia, - La Guardia Field, Chicago. |

| Stopnje | S F R J | Z D A |
|---|---|---|
| 22l - 23o | | |
| 23l - 24o | | |
| 24l - 25o | | |
| 25l - 26o | Bjelašnica | Stampede Bass, — |
| 3o3 | | Nount Washington |

| Stopnje | S F R J | Z D A |
|---|---|---|
| 41 - 5o | Planina Sevnica, Maribor-Tezno, Pragersko, Zavrč, Jeruzalem, Gomance, Črnomelj, Varaždin, Pazin, Stubička gora, Topusko, Bjelovar, Garešnica, Lipik, Plitvički Leskovac, Mosor-Ljuvač, Prnjavor, Zenica, Tuzla, Šid; Bački Petrovac, Šabac, Beograd, Debeli lug, Kraljevo, Svetozarevo, Crkvice, Trubarevo, Mavrovo-Hanovi, | Spokane, Astoria, Medford, Eureka - Asheville, Lynchburg, Atlantic City, Wilmington Del., Bringhamton, Pittsfield, Sault Ste. Marie, |
| 51 - 6o | Planina Rakek, Rakitna, Brežice, Koprivnica, Delnice, Bistrac, Botinec, Lipovljani, Slav.Požega, Slav.Brod, Brestovac-Belje, Gospić-sinop., Doboj, Maoča, Bustmir, Sokolac, Rogatica, | Tatosh Island, Eugene, Rasenburg — Duluth, Concord, Portland, |
| 61 - 7o | Bled, Hotemež, Mur.Sobota, Rakičan, Postojna Zalog, Sv.Miklavž, Križevci, Bugojno, Titovo Užice, Sjenica, Plevlja, Kolačin, Ivangrad, | Blue, Kamyon, — |
| 71 - 8o | Tolmin, Stara Fužina, Velenje, Višnja gora, Sodražica, Karlovac, Božjakovina, Sisak, Zagreb-Bot.vrh, Sanski most, Jajce, Prijedor, | Block Island, |
| 81 - 9o | Stara vas, Parg, Bukovička banja, Zlatibor, Skopje, | Worcester, |
| 91 - 1oo | Dom na Komni, Radlje, Kočevje, Zagreb-Grič, Sarajevo | Olympia, — Nantucket, |
| 1o1 - 11o | Šmartno Slov.gor., Skrad, Gor.Milanovac, Užička Požega, | Charleston, |
| 111 - 12o | Celje-Medlog, Novo mesto-Kandija, | |
| 121 - 13o | Makronog | |
| 131 - 14o | Goražde, Bijelo polje, | |
| 14o - 15o | Ljubljana - Bežigrad, | |
| 151 - 16o | | |
| 161 - 17o | Sljeme, | Sexton Summit, — |
| 171 - 18o | | |
| 181 - 19o | Ljubljana - letališče, | |
| 191 - 2oo | | |
| 2o1 - 21o | | |
| 211 - 22o | | |

LETNA POGOSTNOST MEGLE

The average frequence of fogs

/IV - 3/

| Stopnje | S F R J | Z D A |
|---|---|---|
| 1 - 5 | Rijeka, Crikvenica, Mali Lošinj, Lun Gager,Rab, Senj, Pag, Biograd na moru, Šibenik, Kaštel-Stari, Split Marjan, Hvar, Opuzen, Palagruža, Vela Luka, Lastovo, Korčula, Ston, Dubrovnik, Lištica, Prozor, Domanovići, Mostar, Kragujevac, Hercegnovi, Budva, Bar, Struga, Ohrid, Resen, Kočani, Valandovo, | Havre, Lander, — Cairo, |
| 6 - 1o | Solkan, Rovinj, Cres, Zadar, Krim, Čilača, Livno, Čapljina, Kuršumlijja, Pirot, Dimitrovgrad, Kriva Palanka, Prilep, Erdželija, Kavadarci, Gevgelija, Novi Dojran, Berovo, | Helena, Sheridan, Casper, Pocatello, Mount Shasta, — Birmingham, Memplis, Luisville, Frederick, Reading, Sandusky, Syracuse, Minneapolis - St.Paul, |
| 11 - 2o | Trenta, Kubad, Sežana-Šmarje, Ložе Vipava, Poreč, Opatija, Fažana, Pula, Veli Lošinj, Drniš, Kalinovik, Gacko, Bileća, Lastva, Jasmenovci, Smederevo, Vrnjačka banja, Aleksandrovac, Rekovac, Kruševac, Čuprija, Prokuplje, Niš, Peć, Vlasotinci, Surdulica, Bosilj grad, Grahovo, Vir Pazar, Titograd, Podkum, Ulcinj, Butelj, Kumanovo, Lazaropole, Bitola, Ržaničani, Titov Veles, Štip, | Glasgow, Great Falls, Yakina, Lewiston, Walla Walla, Buras, Boise, Idaho Falls 46 W, Oakland, Bakersfield, — Pittsburgh, Sioux City, Sint Clond, Wilmington, Cape Hatteras, Nashville, Lexington, Evansville, Washington D.C., Parkersburg, Baltimore Custon H., Springfield, Columbus, Peoria, Burlington, Cleveland, Des Moines, Toledo, Chicago, Erie, Detroit, Grand Rapids, Flint, Roohester N.Y., Roohester Min., Burlington Ver., Alpena, Escansba, Marquette, International-Falls, |
| 21 - 3o | Bovec, Rateče-Planica, Rovtarica, Jezersko, Luče, Temnica, Koper, Ajdovščina, Kostel, Zalesina, Stubiške Toplice, Vinkovci, Ilok, Sinj, Bos.Dubuca, Derventa, Drvar, Banja Luka, Brčko, Bijelina-N. selo, Srbobran, Novi Sad, Gladnoš /Maradik/, Stari Bečej, Senta, Čoka, Zrenjamin, Vršac, Loznica, Valjevo, Pančevo, Topola , Kovin, Šušara, Bela Crkva, Vel.Gradište, Soko banja, Zaječar, Prizren, Kos.Mitrovica, Priština, Uroševac, Bujanovac, Vranje, Leskovac, Predejane, Cetinje, Demir Kapija, Strumica, | Kalispell, Missoula, Pendleton, Portland, Cheyenne, Burbank — Gesnville, Dayton, Akron, Dubuque, Montgomery, Atlanta, Columbia, Florence, Rome, Charlotte, Knoxville, Norfolk, Roanoke, Richmond, Cincinnati, Indianapolis, Philadelphia, Harrisburg, Newark, Mansfield, Fort Wayne, Bridgeport, New Haven, Youngstown, Scranton, Moline South Bend, Providence, Rockford, Detroit Willow Run, Waterloo, Albany, Lansing, Buffalo, Milwaukee, Madison, Muskegon, La Crosse, Green Bay, Caribon, |
| 31 - 4o | Planina Golica, Golnik, Ptuj, Babno polje, Ogulin, Petrinja, Čazma, Daruvar, Đakovo, Osijek-Neuman, Osijek-sinop., Zagreb-Maksimir, Bihać, Palić, Novi Kneževac, Sombor, Vrhas, Sremski Karlovci, Kikinda, Srem.Mitrovica, Smed.Palanka, Žagubica, Bor. Negotin, Čačak, Novi Pazor, Dragaš, Vlasina, Nikšić, Tetovo, Kruševo, | Meacham, Salem, Fresno, — Winston Salem, Chattanonga,Raleigh, Oak Ridge WB, Greensboro, Bristol, Baltimore, Allentown, Hartford, |