

LAMBDA-MAX ECOLOGICAL RESEARCH

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BRYOPHYTES OF CALCAREOUS FENS: MINIMUM REQUIREMENTS FOR SUBMISSION OF COLLECTIONS FOR IDENTIFICATION AND SUGGESTIONS ON SURVEY PROCEDURE

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Herbarium-label information for potential calcareous fen (CF) sites

To ensure proper herbarium labels for the deposition of collections in an herbarium, the following information is needed:

> date of collection name of the primary collector locality information habitat information

Please provide a middle initial, if available, for the primary-collector's name. The names are linked with 3-letter acronyms in the herbarium database.

The required locality information at each collection site can consist of either a legal description (township-range to at least 1/16th section accuracy), or a copy of the 1:24,000/25,000 topo quad (mention quad name) with locality or sites marked, or GPS coordinates in either lat/long or UTM. **Make sure to indicate in which datum system the GPS receiver was calculating the fixes (***i.e.***, WGS-84)**. This is particularly important for UTM coordinates.

Habitat information should include a short description and visual estimate of the proportion of shrub, pool, short-sedge lawn, and spring seepage cover at the potential CF site. Provide information about water-chemistry parameters such as pH and specific conductance, if measured. A few digital

photographs of the site and its different habitats are appreciated and will enhance the report.

Procedures for collecting and preserving bryophyte samples

Use 2-lb brown paper bags (never plastic bags!) to collect samples in the field. Make sure the field staff is aware to **dry the samples as soon as possible** (no need to remove the bryophyte collections from the bags). Drying can be done either in front of a fan (often several days needed) or in a plant dryer @ 60°C (usually a single day suffices). Do not press bryophyte samples, but remove excess substrate from the bryophytes during collecting to limit abrasion of the specimens.

A single bag should not contain more than a single individual bryophyte patch (possibly with intimately associated species: no need to separate those out). Do not put several collections of bryophyte patches that are physically separate in the field in a single bag, even on the same site and when it appears that they might be the same species.

Suggestions on recording: a unique collection number of 5 digits maximum for each bag would be preferable. Pre-numbering the bags and keeping track of the collection-number range for each site or habitat in the field would speed things up, as there would be no need to write on the bags during the collecting in the field. Site and habitat information should be described in the field notes with the associated collection-number ranges. Keep freshly collected bryophyte samples in a large-mesh laundry or burlap bag so that they can breathe until they are dried properly.

Measuring total bryophyte cover and calculating individual species abundance

Several techniques are employed to derive abundance measures of individual bryophyte taxa within an habitat or ecotope (Janssens 2002). I found that for potential CF sites a random-number point-intercept method is most suitable. Many of the bryophyte patches are hidden under thatch, the remaining litter of the graminoids, and are not readily apparent for visual cover estimates as used in plot and relevé methods. Line point-intercepts are easily converted into areal cover (Janssens 2002).

A random-number table (see Appendix) is employed along several 5-m long sections of a measuring tape. The tape is stretched along a line through the potential CF, intersecting its most prominent features. Do not record beyond what is clearly discernable as the fen habitat. As many 5-m long sections can be used as there is habitat available or until a suitable number of point-intercept samples are collected. In sites with sufficient bryophyte cover (>20% or bryophyte hits on average at least once every 5 intercept points), a minimum of 10 bryophyte samples should be collected (25 m of total transect in this case). If none of the linear dimensions of the habitat is long enough to accommodate such a transect, several parallel or intersecting transect lines can be laid out. Often a 15-m transect suffices if total bryophyte cover approaches 50%.

Each row in the random-number table (see Appendix) lists ten random numbers. These numbers, which range from 1 to 500, represent the distance in cm along a 5-m segment of the tape. The tape is put down as close to the surface as possible and a surface sample is taken through the thatch at each one of the 10 random-number cm marks read from the table (Figure 1). Either a plumb line



Figure 1. Point-intercept sampling. Sample at the reading along the tape (from 0 to 500 cm) that corresponds to the number in a row from the random-number table (see Appendix). In this example the sample is taken at 69 cm, 75 cm, 84 cm, etc., until 10 sample locations are identified for the 5-meter transect. Only samples with bryophytes are bagged.

or a visual drop line can be used from the tape down. A small surface sample, usually at or below the water interface, is grabbed between the thumb and forefinger of one hand and examined for the presence of bryophytes. If they are present the entire sample (minus some excess substrate if it can be removed) is dropped in a collection bag. Samples without any obvious bryophyte fragments you can discard in the field. If you are unsure if the sample contains bryophyte material, also drop it in a bag. We can easily confirm the presence or absence under the stereoscope in the lab. These bags without bryophytes will be subtracted from the total tally. [For each 5-m section use another row on the ran-dom-number sheet. For a site surveyed only once, this isn't important, but when permanent line transects are established for long-term monitoring, it is necessary to note down the random-number row that has been used to start the transect, so that future surveys can use a different starting point. The sampling method is in some degree destructive.]

In addition to the line-transect collections, some general collecting can be done in the ecotope (stay within the boundaries of the potential CF!). Those collection bags should be marked separately from those of the line transect. They are useful for (1) recording species that might have been missed along the transect, and (2) for preparing better-quality collections for herbarium deposition (vouchers), because well- developed clones of particular species can be sampled.

Recording: the following information is needed. (1) **The total length of transect** (in whole units of 5-m. (2) **The total number of collection bags used along the transect** (number of hits: either a tally of the bags, or calculated from the number range marked on the bags). Again, it is not

necessary with this method to differentiate among species in the field. Do not separate apparent individual species from each other that occur in a single point sample: put them in the same bag!

Calculation of total and individual bryophyte species cover: (1) The overall bryophyte cover in % on the site is simple the number of bags with bryophytes (hits) divided by the total number of points dropped (10 for each 5-m transect section surveyed). Bags that turned out to have no bryophytes in them are subtracted from the number of hits recorded in the field. (2) The cover for an individual species equals the number of times the species was recorded among the collections times the total bryophyte cover of the site in % divided by the total tally of all species records. Often this total tally is larger than the number of hits, because several bags might contain a mixture of species.

Calculating CF score

All Minnesota fen sites identified as calcareous fens and with comprehensive bryophyte analysis are ranked, both state-wide and regionally. This ranking is based on the presence of obligate, facultative, and occasional calcareous-fen species and is explained in detail in Janssens 2004a. An example of this validation is given with the Ottawa Fen report (Janssens 2004b).

Equipment needed (absolutely necessary)

metric tape, preferably at least 15-m long 2-lb brown paper bags, preferably pre-numbered with your collection number field notebook to record collection-number ranges, and locality and habitat information random-number table (see appendix) waterproof pen handlens digital camera GPS receiver (note datum system employed!) stake or pole to start line transect with measuring tape plumb line laundry bag to store collections temporarily before proper drying rubber bands, to collate collection bags

References

Janssens, J.A. 2002. Methods for the study of bryophyte ecology. Update April 2002. Available from the author janss008@tc.umn.edu.

- Janssens, J.A. 2004a. Classification, indicator value, and regional differentiation of bryophyte species in Minnesota's calcareous fens and validation of calcareous fens, update June 2004. Available from janss008@tc.umn.edu or jeanette.leete@dnr.state.mn.us.
- Janssens, J.A. 2004b. Bryophytes of the Ottawa Calcareous Fen, Le Sueur County, Minnesota, Preliminary Reconnaissance, update June 2004. Report to the Minnesota Department of Natural Resources, Division of Waters. Available from janss008@tc.umn.edu or jeanette.leete@dnr.state.mn.us.

APPENDIX: RANDOM NUMBER TABLE FOR POINT-INTERCEPT LINE TRANSECTS

| 47 81 228 236 320 377 423 436 466 478 13 25 82 88 109 193 332 371 408 444 10 54 97 212 220 237 265 328 421 441 4 32 78 121 152 203 253 296 310 409 420 481 47 73 73 77 78 167 291 382 447 477 12 72 94 98 132 193 301 409 400 203 253 266 310 366 412 29 77 135 211 245 319 379 407 460 478 0 56 62 91 131 134 254 265 313 490 18 44 124 175 191 257 311 335 455 486 10 248 273< | 4 | 7 | 28 | 43 | 48 | 153 | 338 | 415 | 441 | 452 |
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| 8 48 49 96 148 222 316 325 346 420 29 77 135 211 245 319 379 407 460 478 0 56 62 91 131 134 254 265 371 467 17 66 160 180 189 256 290 401 405 458 40 91 93 95 233 249 255 256 313 490 18 24 124 175 191 257 311 335 455 468 40 41 112 188 208 260 299 336 337 364 70 248 273 286 317 330 354 410 484 495 11 28 84 116 140 224 307 421 439 481 3123 126 147 187 197 205 241 302 354 <td>27</td> <td>30</td> <td>40</td> <td>203</td> <td>253</td> <td>296</td> <td>310</td> <td>346</td> <td>396</td> <td>412</td> | 27 | 30 | 40 | 203 | 253 | 296 | 310 | 346 | 396 | 412 |
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| 40 91 93 95 233 249 255 256 313 490 18 24 124 175 191 257 311 335 455 486 40 41 112 189 208 260 299 336 337 364 70 248 273 286 317 330 354 410 484 495 11 57 99 124 147 171 295 312 370 464 11 28 84 116 140 224 307 421 439 481 39 99 120 166 302 360 387 389 442 454 56 128 138 235 236 267 390 422 450 312 126 147 187 197 205 241 302 354 313 174 187 234 253 256 317 379 482 | 17 | 66 | 160 | 180 | 189 | 256 | 290 | 401 | 405 | 458 |
| 18241241751912573113354554864041112189208260299336337364702482732863173303544104844951157991241471712953123704641128841161402243074214394813999120166302360387389442454566589126197240258285366413312312614718719720524130235435561281382352362673904224503282921742223074354374494798425627730438840244745948349934891081182713003233814234657313317418723425325631737948215223632933936239440244945848464952126186284294340362485169182279282296306341364378407 | 40 | 91 | 93 | 95 | 233 | 249 | 255 | 256 | 313 | 490 |
| 40 41 112 189 208 260 299 336 337 364 70 248 273 286 317 330 354 410 484 495 11 57 99 124 147 171 295 312 370 464 11 28 84 116 140 224 307 421 439 481 39 99 120 166 302 360 387 389 442 454 56 65 89 126 197 240 258 285 366 413 3 123 126 147 187 197 205 241 302 354 35 56 128 138 235 236 267 390 422 450 32 82 92 174 222 307 435 377 449 458 484 6 49 52 126 186 284 294 340 <td>18</td> <td>24</td> <td>124</td> <td>175</td> <td>191</td> <td>257</td> <td>311</td> <td>335</td> <td>455</td> <td>486</td> | 18 | 24 | 124 | 175 | 191 | 257 | 311 | 335 | 455 | 486 |
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| 115799124147171295312370464112884116140224307421439481399912016630236038738944245456658912619724025828536641331231261471871972052413023543556128138235236267390422450328292174222307435437449479842562773043884024474594834993489108118271300323381423465731331741872342532563173794821522363293393623944024494584846495212618628429434036248516918227928229630634136437840759648215217319320527032236069758412916229934738340043765155161285299326342355429496 <t< td=""><td>70</td><td>248</td><td>273</td><td>286</td><td>317</td><td>330</td><td>354</td><td>410</td><td>484</td><td>495</td></t<> | 70 | 248 | 273 | 286 | 317 | 330 | 354 | 410 | 484 | 495 |
| 11288411614022430742143948139991201663023603873894424545665891261972402582853664133123126147187197205241302354355612813823523626739042245032829217422230743543744947984256277304388402447459483499348910811827130032338142346573133174187234253256317379482152236329339362394402449458484649521261862842943403624851691822792822963063413643784075964821521731932052703223606975841291622993473834004376515516128529932634239542949699161172214255256322367418430 | 11 | 57 | 99 | 124 | 147 | 171 | 295 | 312 | 370 | 464 |
| 3999120166302360387389442454566589126197240258285366413312312614718719720524130235435561281382352362673904224503282921742223074354374494798425627730438840244745948349934891081182713003233814234657313317418723425325631737948215223632933936239440244945848464952126186284294340362485169182279282296306341364378407596482152173193205270322360697584129162299347383400437651551612852993263423954294969916117221425525632236741843083109120123137191258278353357 <t< td=""><td>11</td><td>28</td><td>84</td><td>116</td><td>140</td><td>224</td><td>307</td><td>421</td><td>439</td><td>481</td></t<> | 11 | 28 | 84 | 116 | 140 | 224 | 307 | 421 | 439 | 481 |
| 56 65 89 126 197 240 258 285 366 413 3 123 126 147 187 197 205 241 302 354 35 56 128 138 235 236 267 390 422 450 32 82 92 174 222 307 435 437 449 479 84 256 277 304 388 402 447 459 483 499 34 89 108 118 271 300 323 381 423 465 73 133 174 187 234 253 256 317 379 482 152 236 329 339 362 394 402 449 458 484 6 49 52 126 186 284 294 340 362 485 169 182 279 282 296 306 341 364 378 407 59 64 82 152 173 193 205 270 322 360 69 75 84 129 162 299 347 383 400 437 65 155 161 285 299 326 342 395 429 496 99 161 172 214 255 256 322 367 418 < | 39 | 99 | 120 | 166 | 302 | 360 | 387 | 389 | 442 | 454 |
| 312312614718719720524130235435561281382352362673904224503282921742223074354374494798425627730438840244745948349934891081182713003233814234657313317418723425325631737948215223632933936239440244945848464952126186284294340362485169182279282296306341364378407596482152173193205270322360697584129162299347383400437651551612852993263423954294969916117221425525632236741843083109120123137191258278353357722773383513524114184194614646568149183275326411451455469 | 56 | 65 | 89 | 126 | 197 | 240 | 258 | 285 | 366 | 413 |
| 3556128138235236267390422450328292174222307435437449479842562773043884024474594834993489108118271300323381423465731331741872342532563173794821522363293393623944024494584846495212618628429434036248516918227928229630634136437840759648215217319320527032236069758412916229934738340043765155161285299326342395429496991611722142552563223674184308310912012313719125827835335772277338351352411418419461464656814918327532641145145546910328031833636337137141248540 | 3 | 123 | 126 | 147 | 187 | 197 | 205 | 241 | 302 | 354 |
| 32 82 92 174 222 307 435 437 449 479 84 256 277 304 388 402 447 459 483 499 34 89 108 118 271 300 323 381 423 465 73 133 174 187 234 253 256 317 379 482 152 236 329 339 362 394 402 449 458 484 6 49 52 126 186 284 294 340 362 485 169 182 279 282 296 306 341 364 378 407 59 64 82 152 173 193 205 270 322 360 69 75 84 129 162 299 347 383 400 437 65 155 161 285 256 322 367 418 | 35 | 56 | 128 | 138 | 235 | 236 | 267 | 390 | 422 | 450 |
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| 34 89 108 118 271 300 323 381 423 465 73 133 174 187 234 253 256 317 379 482 152 236 329 339 362 394 402 449 458 484 6 49 52 126 186 284 294 340 362 485 169 182 279 282 296 306 341 364 378 407 59 64 82 152 173 193 205 270 322 360 69 75 84 129 162 299 347 383 400 437 65 155 161 285 299 326 342 395 429 496 99 161 172 214 255 256 322 367 418 430 83 109 120 123 137 191 258 278 <t< td=""><td>84</td><td>256</td><td>277</td><td>304</td><td>388</td><td>402</td><td>447</td><td>459</td><td>483</td><td>499</td></t<> | 84 | 256 | 277 | 304 | 388 | 402 | 447 | 459 | 483 | 499 |
| 73133174187234253256317379482152236329339362394402449458484649521261862842943403624851691822792822963063413643784075964821521731932052703223606975841291622993473834004376515516128529932634239542949699161172214255256322367418430831091201231371912582783533577227733835135241141841946146465681491832753264114514554691032803183363633803873894154671830315119426332937140141311532062072252973023374424696142285135261301361367472100164201215238363371471472485 <t< td=""><td>34</td><td>89</td><td>108</td><td>118</td><td>271</td><td>300</td><td>323</td><td>381</td><td>423</td><td>465</td></t<> | 34 | 89 | 108 | 118 | 271 | 300 | 323 | 381 | 423 | 465 |
| 15223632933936239440244945848464952126186284294340362485169182279282296306341364378407596482152173193205270322360697584129162299347383400437651551612852993263423954294969916117221425525632236741843083109120123137191258278353357722773383513524114184194614646568149183275326411451455469103280318336363380387389415467183031511942633293714014131153206207225297302337442469614228513526130136136747210016420121523836337147147248540104158209214216274342371389< | 73 | 133 | 174 | 187 | 234 | 253 | 256 | 317 | 379 | 482 |
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| 169182279282296306341364378407596482152173193205270322360697584129162299347383400437651551612852993263423954294969916117221425525632236741843083109120123137191258278353357722773383513524114184194614646568149183275326411451455469103280318336363380387389415467183031511942633293714014131153206207225297302337442469614228513526130136136747210016420121523836337147147248540104158209214216274342371389269311412916422727835541244710144188243266277355386403471< | 6 | 49 | 52 | 126 | 186 | 284 | 294 | 340 | 362 | 485 |
| 59 64 82 152 173 193 205 270 322 360 69 75 84 129 162 299 347 383 400 437 65 155 161 285 299 326 342 395 429 496 99 161 172 214 255 256 322 367 418 430 83 109 120 123 137 191 258 278 353 357 72 277 338 351 352 411 418 419 461 464 65 68 149 183 275 326 411 451 455 469 103 280 318 336 363 380 387 389 415 467 18 30 31 51 194 263 329 371 401 413 11 53 206 207 225 297 302 337 | 169 | 182 | 279 | 282 | 296 | 306 | 341 | 364 | 378 | 407 |
| 69758412916229934738340043765155161285299326342395429496991611722142552563223674184308310912012313719125827835335772277338351352411418419461464656814918327532641145145546910328031833636338038738941546718303151194263329371401413115320620722529730233744246961422851352613013613674721001642012152383633714714724854010415820921421627434237138926931141291642272783554124471101441882432662773553864034715884144190218263323329490491356485194259294408413442443 <t< td=""><td>59</td><td>64</td><td>82</td><td>152</td><td>173</td><td>193</td><td>205</td><td>270</td><td>322</td><td>360</td></t<> | 59 | 64 | 82 | 152 | 173 | 193 | 205 | 270 | 322 | 360 |
| 65155161285299326342395429496991611722142552563223674184308310912012313719125827835335772277338351352411418419461464656814918327532641145145546910328031833636338038738941546718303151194263329371401413115320620722529730233744246961422851352613013613674721001642012152383633714714724854010415820921421627434237138926931141291642272783554124471101441882432662773553864034715884144190218263323329490491356485194259294408413442443173191242318330340361396412473 <td>69</td> <td>75</td> <td>84</td> <td>129</td> <td>162</td> <td>299</td> <td>347</td> <td>383</td> <td>400</td> <td>437</td> | 69 | 75 | 84 | 129 | 162 | 299 | 347 | 383 | 400 | 437 |
| 99161172214255256322367418430831091201231371912582783533577227733835135241141841946146465681491832753264114514554691032803183363633803873894154671830315119426332937140141311532062072252973023374424696142285135261301361367472100164201215238363371471472485401041582092142162743423713892693114129164227278355412447110144188243266277355386403471588414419021826332332949049135648519425929440841344244317319124231833034036139641247367124234264324365418438445452 <td>65</td> <td>155</td> <td>161</td> <td>285</td> <td>299</td> <td>326</td> <td>342</td> <td>395</td> <td>429</td> <td>496</td> | 65 | 155 | 161 | 285 | 299 | 326 | 342 | 395 | 429 | 496 |
| 83 109 120 123 137 191 258 278 353 357 72 277 338 351 352 411 418 419 461 464 65 68 149 183 275 326 411 451 455 469 103 280 318 336 363 380 387 389 415 467 18 30 31 51 194 263 329 371 401 413 11 53 206 207 225 297 302 337 442 469 6 14 22 85 135 261 301 361 367 472 100 164 201 215 238 363 371 471 472 485 40 104 158 209 214 216 274 342 371 389 26 93 114 129 164 227 278 355 | 99 | 161 | 172 | 214 | 255 | 256 | 322 | 367 | 418 | 430 |
| 72 277 338 351 352 411 418 419 461 464 65 68 149 183 275 326 411 451 455 469 103 280 318 336 363 380 387 389 415 467 18 30 31 51 194 263 329 371 401 413 11 53 206 207 225 297 302 337 442 469 6 14 22 85 135 261 301 361 367 472 100 164 201 215 238 363 371 471 472 485 40 104 158 209 214 216 274 342 371 389 26 93 114 129 164 227 278 355 412 447 110 144 188 243 266 277 355 386 <td< td=""><td>83</td><td>109</td><td>120</td><td>123</td><td>137</td><td>191</td><td>258</td><td>278</td><td>353</td><td>357</td></td<> | 83 | 109 | 120 | 123 | 137 | 191 | 258 | 278 | 353 | 357 |
| 6568149183275326411451455469103280318336363380387389415467183031511942633293714014131153206207225297302337442469614228513526130136136747210016420121523836337147147248540104158209214216274342371389269311412916422727835541244711014418824326627735538640347158841441902182633233294904913564851942592944084134424431731912423183303403613964124736712423426432436541843844545262109110114227244312344416448 | 72 | 277 | 338 | 351 | 352 | 411 | 418 | 419 | 461 | 464 |
| 103 280 318 336 363 380 387 389 415 467 18 30 31 51 194 263 329 371 401 413 11 53 206 207 225 297 302 337 442 469 6 14 22 85 135 261 301 361 367 472 100 164 201 215 238 363 371 471 472 485 40 104 158 209 214 216 274 342 371 389 26 93 114 129 164 227 278 355 412 447 110 144 188 243 266 277 355 386 403 471 58 84 144 190 218 263 323 329 490 491 35 64 85 194 259 294 408 413 4 | 65 | 68 | 149 | 183 | 275 | 326 | 411 | 451 | 455 | 469 |
| 18 30 31 51 194 263 329 371 401 413 11 53 206 207 225 297 302 337 442 469 6 14 22 85 135 261 301 361 367 472 100 164 201 215 238 363 371 471 472 485 40 104 158 209 214 216 274 342 371 389 26 93 114 129 164 227 278 355 412 447 110 144 188 243 266 277 355 386 403 471 58 84 144 190 218 263 323 329 490 491 35 64 85 194 259 294 408 413 442 443 173 191 242 318 330 340 361 396 4 | 103 | 280 | 318 | 336 | 363 | 380 | 387 | 389 | 415 | 467 |
| 1153206207225297302337442469614228513526130136136747210016420121523836337147147248540104158209214216274342371389269311412916422727835541244711014418824326627735538640347158841441902182633233294904913564851942592944084134424431731912423183303403613964124736712423426432436541843844545262109110114227244312344416448 | 18 | 30 | 31 | 51 | 194 | 263 | 329 | 371 | 401 | 413 |
| 6 14 22 85 135 261 301 361 367 472 100 164 201 215 238 363 371 471 472 485 40 104 158 209 214 216 274 342 371 389 26 93 114 129 164 227 278 355 412 447 110 144 188 243 266 277 355 386 403 471 58 84 144 190 218 263 323 329 490 491 35 64 85 194 259 294 408 413 442 443 173 191 242 318 330 340 361 396 412 473 67 124 234 264 324 365 418 438 445 452 62 109 110 114 227 244 312 344 < | 11 | 53 | 206 | 207 | 225 | 297 | 302 | 337 | 442 | 469 |
| 10016420121523836337147147248540104158209214216274342371389269311412916422727835541244711014418824326627735538640347158841441902182633233294904913564851942592944084134424431731912423183303403613964124736712423426432436541843844545262109110114227244312344416448 | 6 | 14 | 22 | 85 | 135 | 261 | 301 | 361 | 367 | 472 |
| 40104158209214216274342371389269311412916422727835541244711014418824326627735538640347158841441902182633233294904913564851942592944084134424431731912423183303403613964124736712423426432436541843844545262109110114227244312344416448 | 100 | 164 | 201 | 215 | 238 | 363 | 371 | 471 | 472 | 485 |
| 269311412916422727835541244711014418824326627735538640347158841441902182633233294904913564851942592944084134424431731912423183303403613964124736712423426432436541843844545262109110114227244312344416448 | 40 | 104 | 158 | 209 | 214 | 216 | 274 | 342 | 371 | 389 |
| 11014418824326627735538640347158841441902182633233294904913564851942592944084134424431731912423183303403613964124736712423426432436541843844545262109110114227244312344416448 | 26 | 93 | 114 | 129 | 164 | 227 | 278 | 355 | 412 | 447 |
| 58841441902182633233294904913564851942592944084134424431731912423183303403613964124736712423426432436541843844545262109110114227244312344416448 | 110 | 144 | 188 | 243 | 266 | 277 | 355 | 386 | 403 | 471 |
| 35 64 85 194 259 294 408 413 442 443 173 191 242 318 330 340 361 396 412 473 67 124 234 264 324 365 418 438 445 452 62 109 110 114 227 244 312 344 416 448 | 58 | 84 | 144 | 190 | 218 | 263 | 323 | 329 | 490 | 491 |
| 173 191 242 318 330 340 361 396 412 473 67 124 234 264 324 365 418 438 445 452 62 109 110 114 227 244 312 344 416 448 | 35 | 64 | 85 | 194 | 259 | 294 | 408 | 413 | 442 | 443 |
| 67 124 234 264 324 365 418 438 445 452 62 109 110 114 227 244 312 344 416 448 | 173 | 191 | 242 | 318 | 330 | 340 | 361 | 396 | 412 | 473 |
| 62 109 110 114 227 244 312 344 416 448 | 67 | 124 | 234 | 264 | 324 | 365 | 418 | 438 | 445 | 452 |
| | 62 | 109 | 110 | 114 | 227 | 244 | 312 | 344 | 416 | 448 |