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# BioWish: a molecular biology command extension to Tcl/Tk

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The Tcl/Tk (Ousterhout, 1994) scripting language has proved to be a powerful tool for building programs involved in the analysis of molecular sequence data. However, typical 'biological' operations, like the translation of a nucleotide sequence to the corresponding amino acid sequence, or the calculation of the G + C content in different codon positions in a 50 kbp cosmid sequence, are performed far too slowly with the standard Tcl commands. To circumvent this problem, we have constructed a library that extends the Tcl/Tk language by adding primitive operators suited for sequence analysis implemented in the C-language. Additional commands related to molecular biology, written in Tcl, are included. Built as a shared library, usage is easy and does not require modification of the Tcl/Tk source code.

BioWish can be obtained from the WWW site http://evolution.bmc.uu.se/~thomas/mol_linux. The distribution consists of a single C-source file which should compile without modifications on all Unix systems capable of dynamical loading. It requires Tcl 7.5/Tk4.1 or higher. No patching of the Tcl/Tk core is required. On systems where dynamic loading is not available, BioWish can be compiled as a standalone Tk intepreter.

Features of BioWish:
sequence editing: reverse, complement, antiparallel;
translations;
sequence statistics;
G + C content in different positions;
dna incrementor;
sequence mutation;
database searches with BLAST;
sequence-editing widget;
text-editing widget.

Using BioWish in Tcl scripts requires only a single additional line, a directive to the Tcl intepreter to load the command extension from the shared library, via the load command.

```
load ./biowish.so
bio_readfasta ecoli.fas seq
set s [string tolower $seq(sequence)]
puts [bio_seqinfo $s]
for { set nt aaa} {$nt!="aaaaaaa"} {bio_dna_incr nt
 [puts "$nt = [regsub -all $nt $s { } temp"]
```

BioWish also includes a sequence-editing Tk widget which takes advantage of the extended Tcl commands (Figure 1).

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## References

Ousterhout,J.K. (1994) *Tcl and the Tk Toolkit* Addison-Wesley, Reading, MA.

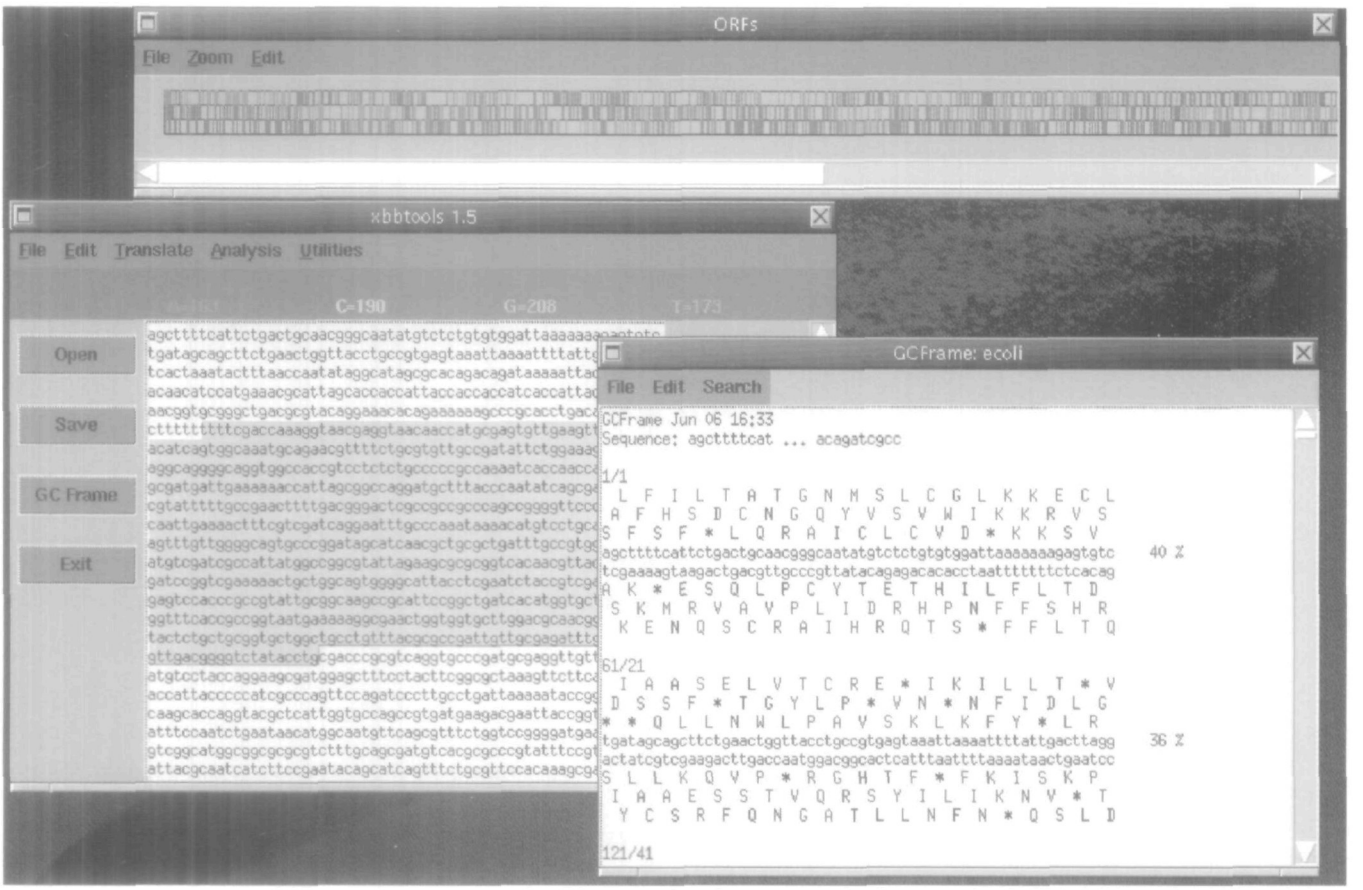


**Fig. 1.** A screen shot of the Tk sequence-editing widget