





VXEVWUDWH PDWHULDO E\ KDQG VRUWLQJ DIWHU ZKLFK HDUWKZRUPV ZDV  
ZDVKHG LQ WDS ZDWHU WR UHPRYH WKH DGKHULQJ PDWHULDO IURP WKHLU ERG\  
DQG VXEVHTXHQWO\ ZHLJKHG RQ D OLYH ZHLJKW EDVLV &RFRRQV ZHUH  
VHSDUDWH DQG FRXQW DQG LQWURGXFH LQ WKH VDPH ZD\ LQ ZKLFK WKHLU  
SDUHQW ZDV UH DUHG 7RWDO QXPEHU RI GHDG HDUWKZRUPV ZDV FRXQWHG DQG  
PRUWDOLW\ ZDV PHDVXUHG > @

7UHDWPHQW\VVWLWXHQWV

&RQWURO:DWHU K\DFLQWK FRZ GXQJ VZ GXVW

'6 'LVWLOOHU\ VOXGJH :DWHU K\DFLQWK FRZ GXQJ VZ GXVW

'6 'LVWLOOHU\ VOXGJH :DWHU K\DFLQWK FRZ GXQJ VZ GXVW

'6 'LVWLOOHU\ VOXGJH :DWHU K\DFLQWK FRZ GXQJ VZ GXVW

'6 'LVWLOOHU\ VOXGJH :DWHU K\DFLQWK FRZ GXQJ VZ GXVW

'6 'LVWLOOHU\ VOXGJH

36



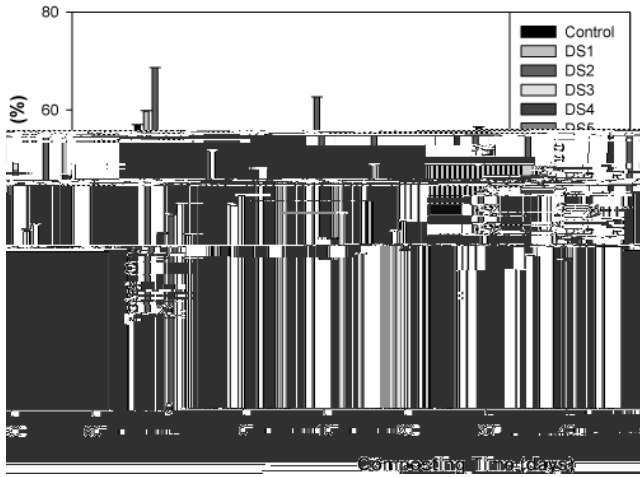


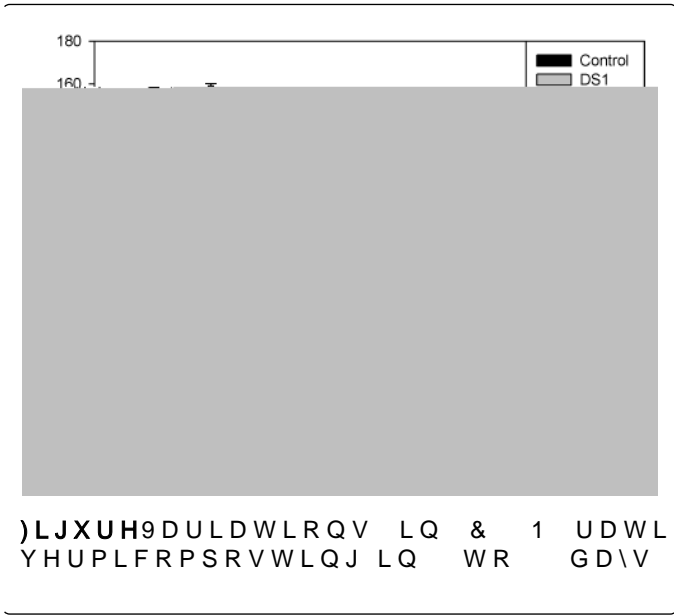
)LJXUBKDQJHV LQ S+ GXULQJ FRPSRVWLQJ DQG YHUPLFRPSRVWLQJ  
DIWHU DQG GD\

ORLVWXUH FRQWHQW

ORLVWXUH FRQWHQW LV DQ LPSRUWDQW IDFWRU LQ GHJUDGDWLRQ EHFDXVH LV  
LQIOXHQFHV WKH VWUXFWXUDO DQG WKHUPDO SURSHUWLHV RI WKH PDWHULDO D  
DV WKH UDWL RI GHJUDGDWLRQ DQG PHWDEROLF SURFHVV RI PLFURRUJDQLVPV  
3UHYLRXV UHVXOWV LQGLFDWHG WKDW J RI RUJDQLF PDWWHU UHOHDVHV DERX  
N- RI KHDW HGHUJ\ ZKLFK LV VXIILFLHQW WR YDSRULJH J RI ZDWHU > @  
7KH PRLVWXUH FRQWHQW EFRPHV D OLPLWLQJ IDFWRU DQG WKH UDWL RI  
GHFRPSRVLWLRQ GHFUHDVHV UDSLGO\ ZKHQ WKH PRLVWXUH FRQWHQW GHFUHDVH  
EHORZ WR ORLVWXUH FRQWHQW GXULQJ WKH GD\ FRPSRVWLQJ  
ZDV FDOFXODWHG )LJXUH DQG ZDV FRQWUROOHG GLUHFWO\ E\ DGGLQJ ZDWHU  
GXULQJ GD\ YHUPLFRPSRVWLQJ WR PDLQWDLQ PRLVWXUH DURXQG  
,QLWLDO PRLVWXUH FRQWHQW LQ DOO WKH FRPSRVWLQJ WUHDWPHQWV ZDV LQ  
UDQJH RI 2Q WKH WK GD\ RI PLFURELDO FRPSRVWLQJ WKH ILQDO

DQG DV WKH 72& ZDV GHFUHDVHG LQ VXEVTXHQW WUHDWPHQWV 6LJQLILFDQW  
SHUFHQW ORVV ZDV REVHUYHG LQ 72& GXULQJ WKH GLVWLOOHU\ VOXGJH DQG  
SDLQW VOXGJH FRPSRVWLQJ RQ WK GD\ DQG YHUPLFRPSRVWLQJ RQ WK  
GD\ GXH WR GHJUDGDWLRQ RI PRUH ODELOH IUDFWLRQV RI WKH RUJDQLF PDWWH  
E\ LQRFXODWHG PLFUR RUJDQLVPV > @





)LJXUH9DULDWLRQV LQ & 1 UDWLR GXULQJ FRPSRVWLQJ DQG  
YHUPLFRPSRVWLQJ LQ WR GD\

\$ QRWLFHDEOH LQFUHDVH LQ WKH QXPEHU RI HDUWKZRUPV DV ZHOO DV WKH



\$FNQRZOHGJHPHQW

\$XWKRU ZRXOG OLNH WR WKDQN WKH ,  
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JUDWLWXGH , ZLVK WR H[SUHVV P\ VLQF  
\$UFKDQD 7LZDUL +2' 6FKRRO RI %LRWHF

/LFNDF]3HQQ\ ' 6RLO RUJDQLF PDWWHU  
'HYHORSPHQW \*RYHUQPHQW RI \$OEHUWD 3C  
, QABDQKXOYWLW.XWHRRI.6RLO &FLPHED  
%XUVLQV FREWKVWLGGHNS GYHQVHQWIRUJDQ  
FRPSRVWDDWXLWV\%VXSHURXLVRFKQRO  
KQROOJX3R]39 8DWRSDOV ) ORQWHUR -, 6  
ZDVWH PDQDJHPHQW LQ SURWHFWHG KRUWL  
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HDUWKZRUPV -RXUQDO RI 6RLO 6FLHQFH  
6XW6DU &RPPHQWV RQ WKH f1LWUDWH  
ZDWHU RI VRPH UXUDO DUHDV RI 5DMDVW

&RJJH 3RWHQWLDO FRPSRVW EHQHILV  
WLVWDDHFPHQWUWRORXJH HORSPHQW &R  
LQGLJHQRXV VSHFLHV RI  
\$JDUZDO 6 6LQKD 5. 6KDUPD - 9HUP  
KROWDFKQWURQ LQJRRRQ LPSDFW VWXG  
FRPSRVW DQG - YHUPLFRPSRVW YLV D YLV FK  
\LHOG RI ODG V ILQJHU \$EHOPRVFKXV HVF

6LQKD 5. +HUDW 6 %KDUDPEH \* \$VKLVK %  
VHZDJH VOXGJH ELRVROLGV E\ HDUWKZ  
ELRKDJDUG GHVWLQHG IRU ODQGILOO GLVS  
DQG VDIH ELRIHUWLOL]HU IRU IDUPV - :  
\$UDYHD 9DOHQWLQ 0& 0RUD 0/ \*DOOD  
\$SOLFDFLQ GH ORGRV GH SODQWD GH  
DOJXSRVSLHGDLFDV PLGMXHORO F£QL 6RLO  
3ODQW 1XWU  
2 %ULHQ 7\$ +HUEHUW 6- %DUNHU \$9  
PL[WXUHV RI SDSHU PLFOP XORLSDQDQGDV

\*OREDQ (PPLVWDELOLVWV XHV  
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DQDJKSHWK -6 %LRGHJUDGDWLRQ RI  
FRKRGRFRFFXV VS 1&0 DQG ,WV 7R[LF  
ORUDWSPULHQDWHGH FHOXORVD HIHFWR HQ  
3UDEKIDOLN \$ 6KDUPD 6 9HUPLFRPSRV  
2SWLRQ IRU )HUPHQDWLRQ DQG 'H 'HFR  
&USZWRLO \$RUQ:DWHYDU\LQJ  
DLQJK \$ 6KDUPD 6 &RPSRVWLQJ RI D  
7UHDWPHQW ZLWK 0LFURRUJDQLVPV DQG 6

5DWR 1XQHV - &DEUDO ) /µSH] 3L³HLUR \$  
SURSHUWLHV DQG ZKHDW SURGXFWLRQ  
DSSOLFDFWLRQ RQ WZR 0HGLWHUUDQHDQ

%LRKHURWUHFKQROFVW RQ VRLO  
\$UDYHD 9DOHQWLQ 0& 0RUD 0/ \*DOOD  
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ZLWK 8QWUHDWHG DQG &RPSRVWHG 7H[WL

&UX] 5LJKH\$WWRJXHLSJD ([SHULPHQWDO  
RI VRLO JURXQGZDWHU LQSDFRVW 60ZVHHE\

DXVKLN\*DUJ 9. 9HUPLFRPSRVWLQJ RI  
0LOO 6OXGJH DQG &RZ 'XQJ ZLWK WKH (SLJH

&KDQGD 5 .XPDU . 6LQJK - ,PSDFW R  
XQWUHDWHG UDZ GLVWLOOHU\ HIOXHQW  
WRWDO FKORURSK\OO DQG SURWHLQ FRQW  
%LRO  
%KDUD5DY&KDQGD 5 5DL 9 3K\WRH  
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VRLO %LRUHVRXUFH 7HFKQRORJ\  
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DQDJKSHWK -6 %LRGHJUDGDWLRQ RI  
FRKRGRFRFFXV VS 1&0 DQG ,WV 7R[LF  
(QYLURQ &RQWDP 7R[LFRO  
WUHDWPHQW ZLWK 0LFURRUJDQLVPV DQG 6  
3K\WRHURWUHFKQROFVW RQ VRLO  
3€ @p°Àà@PÀ  
@HIOXHQW 30'( LUULJDWHG

3DUWRYURWIDEDG 7% 5RRVWDD]DG 5 %DKPDHL 0  
0DQDJHPHQW RI VR\EHQDQ RLO UHILQHU\ ZDVWHV  
SURGXFLQJ ELRVXUIDFWDQW XVLQJ 3VHXGRPRQDV  
0LFURELRO %LRWHFQRO  
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SURFHVVHV WKH FDVH RI %R]HQ :DVWH 0DQDJ 5HV  
6DQWL£DXHQDU -( 3RQH 2UWHJD -0 %HW]DEH \*RQ]£OH] &DPSRV -  
6HUQD \*RQ]£OH] 0 (0 +DOZDJL 00 2SWLPDO SODQQLQJ IRU WKH  
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:RUOG -  
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WLVWDDHFPHQWUWRORXJH HORSPHQW &R  
LQGLJHQRXV VSHFLHV RI  
\$JDUZDO 6 6LQKD 5. 6KDUPD - 9HUP  
KROWDFKQWURQ LQJRRRQ LPSDFW VWXG  
FRPSRVW DQG - YHUPLFRPSRVW YLV D YLV FK  
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6LQJK \$ 6KDUPD 6 &RPSRVWLQJ RI D FURS  
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%LRUHVRXU 7HFKQRO  
)LQVWLOOHU )& 6WURP 3) 0RQLWRULQJ DQG  
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)HGHUDWLRQ  
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-RXUQDO :DWHU 3ROOXWLRQ &RQWURO  
DJHQWV RQ IRRG ZDVWH  
UHVRXUFH LQ  
UHVLHZ :DVWH 0DQDJ

:DONHO\